

Montana Outdoors

March/April 1980
One Dollar



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THE COVER: Two red foxes symbolize the theme for National Wildlife Week 1980: “Save a Place for Wildlife.” This year’s event, March 16-22, marks the 43rd year of National Wildlife Federation sponsorship. As the federation notes, “Only by saving a place for wildlife can we protect the beauty and interest it adds to our lives . . .” (back cover poster photo: Brian Milne). Surely one of Montana’s most beautiful and interesting species is the pelican (front cover photo: Mike Aderhold). Although most people aren’t aware of it, this huge white bird is found along most large waterways in Montana. Turn to Vince Yannone’s article, “A Wonderful Bird is the Pelican” (page 14), to find out more about this spectacular feature of our wildlife world.



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The Editor's Column

Anthropologist Ashley Montagu once wrote: "In a time of crisis, the only philosophically tenable position—even for a pessimist—is optimism." His words apply to many situations, but certainly, as we enter the decade of the '80s, they apply to wildlife conservation.

In the Jan./Feb. 1980 issue of *Montana Outdoors*, we recounted the disappearance of two of Montana's wild creatures—the passenger pigeon and the Audubon bighorn sheep—and detailed the plight of several other animals, fishes and plants considered rare, endangered or of special concern in the state. In this issue, we have continued in that vein with articles on three more species that have suffered as a result of man's activities: the whooping crane, the prairie chicken and the paddlefish.

With all this emphasis on species that have become extinct or whose numbers have declined dramatically, it is tempting to conclude that the future of wildlife—even in Montana—looks bleak. Yet, despite continuing adverse impacts from pollution, various types of development and dwindling habitat, there is much to be optimistic about.

The world whooping crane population, which stood at 21 in 1954, has recovered to 118, and the big birds are now in better shape than at any time during this century. As Mike Aderhold's article in this issue points out, whoopers are occasionally spotted in Montana as they make their migratory trek from the breeding grounds in northern Alberta and the Northwest Territories to the wintering grounds on the southwestern coast of Texas.

Although prairie chickens were once widely distributed throughout the eastern and midwestern United States, they were never common in Montana. They prospered here only a short time—in the interval between the demise of the buffalo and the widespread cultivation and grazing of the native prairie. Through some diligent detective work, work, Ken Walcheck has pieced together a fascinating account of this grand bird's brief odyssey in Montana.

Biologist Rod Berg says the paddlefish is among the most primitive of living fishes. Although once rather common throughout much of the Mississippi-Missouri River system, its numbers have declined considerably in the last century, primarily because of dams that impede spring spawning migrations. But populations in Montana are still sufficient to allow a limited harvest, and spring finds fishermen flocking to key stretches of the Missouri and Yellowstone rivers where the giant spoonbills congregate.

Fortunately, the situation for many wildlife

species in Montana is still bright. Most game species have multiplied in the past 80 years and some, like the pronghorn antelope and the white-tailed deer, have rebounded from dangerously low levels. The nationwide pronghorn population, estimated at less than 30,000 animals in the 1920s, now stands at about 400,000. White-tailed deer are believed to be more common in the United States today than when Columbus landed. In Montana, whitetails recovered from a low point in the early 1900s, and have gradually extended their range to include most of the state.

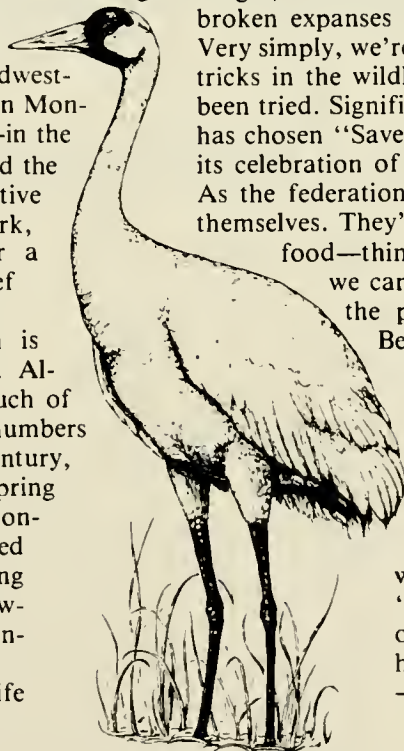
Even though many game species are more plentiful now than they were around the turn of the century, we cannot afford to be complacent. The crisis of the early 1900s was met and resolved in favor of wildlife by putting an end to market hunting, by establishing state fish and game departments to scientifically manage wildlife and by instituting a solid system of financial support for wildlife conservation and restoration.

But we are now facing a new crisis, one that will ultimately determine the fate of wildlife in America. This crisis involves the fight for habitat—for living space—without which wildlife cannot survive. In the past, we were often able to compensate for habitat removal or disturbance by transplanting wildlife, by setting aside new management areas or by producing more wildlife on fewer acres. But today there are no more remote mountain ranges, no more uncharted rivers and streams, no more unbroken expanses of rangeland upon which to fall back. Very simply, we're running out of room, and there are few tricks in the wildlife manager's bag that haven't already been tried. Significantly, the National Wildlife Federation has chosen "Save a Place For Wildlife" as the theme for its celebration of National Wildlife Week, March 16-22. As the federation notes: "... People have to plan for themselves. They've got to have houses, airports, energy, food—things that use up land and resources. But we can be more careful than we have been in the past about where and what we build.

Better planning can help us meet our own needs, as well as the habitat needs of wildlife."

We can meet the wildlife crisis of the years ahead, but it will require a renewed commitment and willingness to make hard choices. From now on, we must either provide room for wildlife, or we will lose it—forever. To "Save a Place For Wildlife" can enrich our own lives and guarantee the same heritage for those who will follow.

—Dave Books



graphics: Jeff Oens



Wintering grounds for whooping cranes include the Aransas National Wildlife Refuge in Texas (photo: Marty Stouffer).

Is Its Number Up?

by Mike Aderhold

AT THE END of 1979, the world population of whooping cranes was at least 118. Seventy-six migrated south to the Texas coast from Wood Buffalo National Park in northern Alberta and the Northwest Territories. It is the only surviving, naturally nesting wild flock. Fifteen are in the experimental, free-flying Gray's Lake, Idaho, flock. This flock was started in 1975 and winters in and near the Rio Grande drainage of New Mexico. Twenty-five birds are in the captive flock at the Patuxent Wildlife Research Center near Laurel, Md., and two are at the International Crane Foundation's research facility at Baraboo, Wis.

The whooping crane was first described for science in 1758 from two specimens: one from South Carolina and one from the west shore of Hudson Bay, Canada. The scientific opinion now is that even then these birds were not plentiful. One researcher has cited a total population of 1,500-2,000 and another 1,200-1,300, before western development. Still, the birds were widely distributed, summering over central North America west to the Great Salt Lake and north to the Arctic. During the 1700s and early 1800s, they wintered along the middle Atlantic coast and along the Gulf Coast from Louisiana to Mexico. They were also

observed wintering in the tableland marshes of west central Texas and central Mexico.

By 1858, whoopers had disappeared from the East Coast. By 1900, the only wintering grounds east of the Mississippi were on the Louisiana coast. The last nests were documented in Illinois in 1870, North Dakota 1889, Iowa 1894, Manitoba 1906, Alberta 1914 and Saskatchewan 1922. Of 11 nonmigrating whoopers resident along coastal Louisiana in 1938, six survived a 1940 hurricane and the last bird disappeared in 1949. The species' decline is not well documented, but the most dramatic drop occurred between 1870 and

1910. It can probably be attributed to a combination of spreading civilization, associated human and domestic animal disturbance, market gunning, fire, drainage of prairie marshes, predation, introduced poultry diseases and egg collecting, a fashionable 19th-century hobby.

During the dry Depression years of the 1930s, a wave of wildlife awareness swept the nation and affected Congress. In a belated effort to save the whoopers from extinction, Congress in 1937 established the Aransas National Wildlife Refuge, the bird's last known wintering ground, on the southwestern coast of Texas.

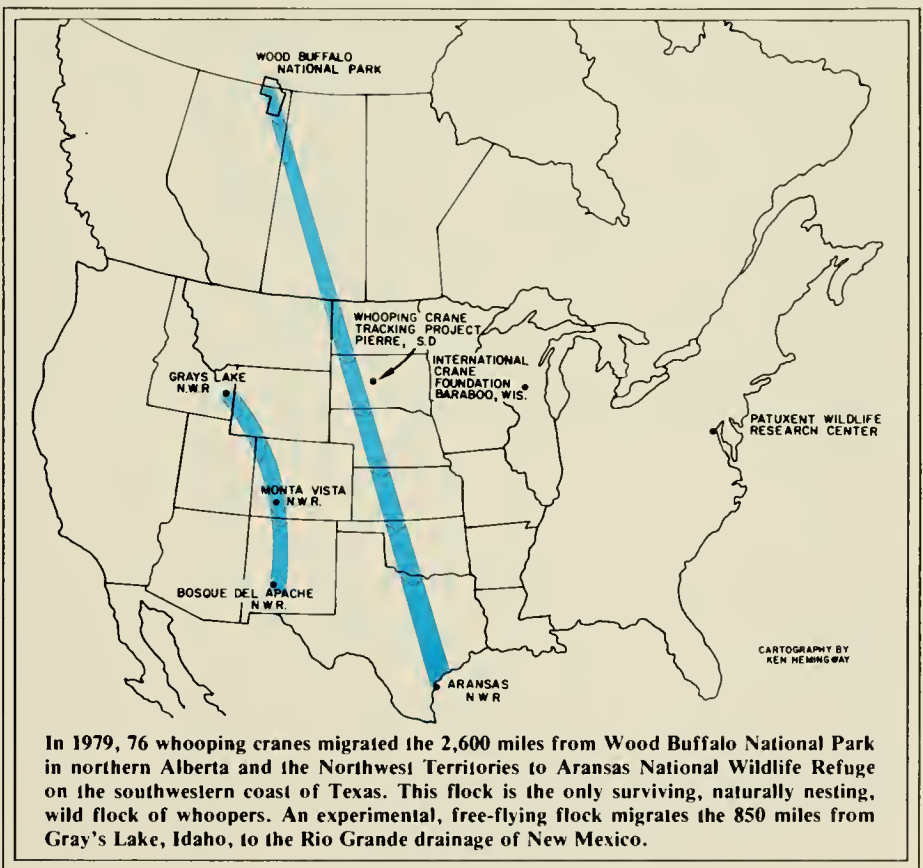
About the same time, the National Audubon Society pioneered an educational program. It was joined by the Canadian Wildlife Service, the U.S. Fish and Wildlife Service (FWS) and later many others—scientists, landowners, sportsmen, educators, writers and organizations. An effort was made to study the bird's biology but no nesting had been observed since 1922. It wasn't until 1954, during a forest fire in the huge Wood Buffalo National Park, that a helicopter ferrying fire-fighting equipment spotted two adult cranes and a week-old chick. Since then, the Canadian Wildlife Service has protected the nesting area and monitored egg production.

In fall 1941, only 15 whooping cranes (13 adults and two young) made the 2,600-mile flight to Aransas. With six in Louisiana, that left only 21 cranes surviving. Thirteen years later, in 1954, still only 21 survived.

After their nesting area was discovered, several ideas emerged about how the species could be helped. One was to try captive propagation, using the latest techniques developed in the poultry business. Another was to use foster parents—such as the whooper's close relative, the sandhill crane—in a controlled situation. It was decided initially to protect and study the wild birds until their numbers increased. The educational program was targeted at cutting down migration losses. Research later showed that whooping cranes normally lay two eggs, but that one of the nestlings quickly becomes dominant and its nest mate seldom sur-



Two of the 25 captive whoopers residing at the Patuxent Wildlife Research Center near Laurel, Md. (DFWP photo: Mike Aderhold).



vives. Researchers further discovered that removing one of the eggs does not unduly disturb the crane or significantly affect natural production.

With this information, biologists were ready in 1967 to try captive propagation. The "extra" eggs were transported to the FWS Patuxent

Wildlife Research Center where they were incubated. Some early problems surfaced and mortality among the young was high because of pneumonia, hatching abnormalities, leg and foot problems and the young whooper's aggressiveness. By 1974, 19 birds had been reared from 50 eggs. Artificial insemination as a

breeding technique was first successful in 1973, but the first fertile eggs were not produced until 1975. A crop of 23 eggs was produced in 1978. Recently, this facility has enjoyed a little more success raising the young and 25 whoopers now reside at Patuxent—16 from Canadian eggs, eight young raised at the facility and one wild bird brought in with a wing injury.

In the mid-1970s, a number of facts and ideas came together. A 1975 epidemic of avian cholera in Nebraska caused renewed concern for the single migrating whooper flock. Nine of the birds landed in infected waters and left 36 hours later, fortunately unaffected. The vulnerability of the small flock nesting and wintering close together and migrating 2,600 miles had to be considered.

At the University of Idaho, biologists had been studying a western flock of greater sandhill cranes and a technique called cross-fostering, where eggs were transferred from one nest to another and the receiving birds reared young not their own. These sandhills nested in southeastern Idaho, rested while migrating in southern Colorado and wintered in central New Mexico, all on national refuges. Their migration route, approximately 850 miles, was less than one-third the distance traveled by the Aransas flock of whoopers.

Less than one *new* whooper in five was making it to the wintering grounds from Canada. The Patuxent operation was then successfully producing a good egg crop, but was still having problems rearing birds to maturity. Also, the need to supply the Patuxent Research Center with eggs from Canada was no longer essential. There were still many unanswered questions, but after considerable discussion, researchers decided to try to establish a new flock using "extra" eggs from Canada (later from both Canada and Patuxent) in a cross-fostering experiment involving Idaho's sandhill cranes.

In May 1975, 14 eggs were flown from Wood Buffalo National Park and placed in 14 sandhill nests after the sandhill eggs had been removed. Three eggs were infertile, coyotes got two, nine hatched; six made it to

flight stage and four of these were seen on the New Mexico wintering grounds. These four plus the eight reared in Canada that year represented the largest annual increase this century. It is not uncommon for juvenile cranes to wander, and only one of the four Gray's Lake cranes returned to the nesting area. Two spent the summer in Utah and the fourth spent part of the summer near Melville, Mont.

In 1976, 15 Canadian eggs and two from Patuxent were tried. Coyotes got four eggs, one was infertile and a raven got one. Of the 11 birds that hatched, one chick died from pneumonia, three disappeared during a five-day storm and three were lost to unknown causes during the summer. Only four birds survived to flight stage and flew south, but one flew into a barbed wire fence in Colorado. With the four wanderers from 1975, the total was seven wintering birds in two years from 31 eggs. The total number of whoopers, captive and wild, was around 100 by the end of 1976.

In May 1977, 30 eggs were put out; 15 hatched and four survived to fly south. In 1978, 28 eggs were put out and 14 hatched. The Gray's Lake experimental flock now comprises 16 birds. Eight made it to flight stage this past year. All were banded, five with two-ounce radio transmitters. One of the radioed whoopers was taken by a golden eagle over Colorado.

Whooping cranes do not become sexually mature until they are 4-6 years old. None of the 16 birds in the experimental flock has bred yet, so it is really too early to call the cross-fostering program a success. Hopefully, the oldest birds will begin breeding in the next two years.

In addition to the natural production in Canada, the cross-fostering production at Gray's Lake and the captive production at Patuxent, a fourth effort is under way at the International Crane Foundation's facility to encourage production from a pair of whoopers on loan.

Efforts to produce whooping cranes have not been without problems and criticism. Many people complain that the species is not worth the time, trouble and dollars being spent on it, since the population

Very little has been written about the whooping crane in Montana. In 1912, Dr. William Hornaday, director of the New York Zoological Park, wrote to Henry Arave, state game warden (now called director), asking about declining species. Arave replied the passenger pigeon and the whooping crane were no longer seen and probably had become extinct.

No records or evidence indicate the species ever nested in Montana. However, the last (1922) nesting records for whooping cranes in Saskatchewan are just 260 and 200 miles north of Havre and Glasgow, respectively, and two North Dakota nesting records are even closer. One is just east of Minot—within 150 miles of Sidney—and the other is just 40 more miles east. So the big cranes could have nested in Montana during historic times, possibly in the slough areas of the extreme northeastern corner or in the Whitewater wetlands north of Malta.

The observation record for the whooping crane is thin. Some sightings close in time were probably the same birds seen from different places by different people. Unfortunately, some observations were not well reported, leaving room for question.

The frequency of whooping crane sightings in recent years seems to reflect their growing numbers. The population at Gray's Lake, Idaho, should increase the number of sightings in the western half of the state. With perseverance, the numbers will continue to grow, giving Montanans a better chance to observe these magnificent relics from the ice age.

Department files indicate possible whooping crane sightings near Great Falls (1964) and near Bozeman (1965). Other sightings were reported from information received by P. D. Skaar: Chouteau County (Sept. 17, 21, 1964), Gallatin County (Sept. 17 or 18, 1965), possibly in Sheridan County (August 1967), Fallon County (in fall, unspecified recent year) and in Sheridan County (spring 1976). These sightings were not included on the chart because of lack of details. The chart was compiled with the assistance of: Dennis Flath, nongame biologist, Department of Fish, Wildlife and Parks, Bozeman, Mont.; Wallace Jobman, wildlife biologist, U.S. Fish and Wildlife Service, The Cooperative Whooping Crane Tracking Project, Pierre, S.D.; Fran Larson, secretary, U.S. Fish and Wildlife Service, Medicine Lake National Wildlife Refuge, Medicine Lake, Mont.; P. David Skaar, author of "Montana Bird Distribution," Bozeman, Mont.

may never be secure. Protection of whooping cranes during their migration, restrictions around their summering and wintering areas and some provisions of the Endangered Species Act have interrupted planned development and traditional human activities and cost the bird some friends.

Montana Whooping Crane Observations Documented Since 1958

Date	County	No.	Area
Oct. 4, 1958	Sheridan	1	Eastern portion of Medicine Lake National Wildlife Refuge (NWR). This was the first record of whooping cranes using the refuge which was established Aug. 19, 1935.
Oct. 13, 1958	Sheridan	4	Eastern portion of Medicine Lake NWR.
Oct. 14, 1958	Sheridan	1	Medicine Lake NWR.
April 3 or 4, 1960	Petroleum	7	Near Winnett.
April 29, 1960	McCone	18	Between Vida and the Missouri River.
May 4, 1960	Sheridan	4	Medicine Lake NWR.
Oct. 25, 1961	Sheridan	4	Eastern portion of Medicine Lake NWR.
Spring 1962	Sheridan	2	Observed in flight over Medicine Lake NWR.
April 30, 1963	Roosevelt	2	Harmond Ranch south of Bainville.
April 30, 1963	Roosevelt	8	Harmond Ranch in a different area.
April 30, 1963	Sheridan	1	Medicine Lake NWR.
May 3, 1964	Sheridan	2	Reported near Dagmar, one mile from northeastern corner of Medicine Lake NWR.
Sept. 26, 1965	Sheridan	3	West of Medicine Lake in flight.
Oct. 16-17, 1965	Roosevelt	3	Twenty miles southeast of Medicine Lake NWR.
May 13, 1967	Gallatin	4	Five miles west of Bozeman.
Oct. 18-19, 1967	Sheridan	3	Gaffney Lake, east of Medicine Lake NWR. The area was closed to hunting until the cranes left.
Oct. 29, 1967	Sheridan	3	Katy's Lake, eastern portion of Medicine Lake NWR.
Oct. 29, 1967	Sheridan	8	In flight over Medicine Lake NWR.
Nov. 12, 1967	Sheridan	1	One mile northeast of the Medicine Lake NWR headquarters.
(unspecified date)	Phillips	?	Near Hewitt Lake NWR.
May 4-8, 1968	Wibaux	4	Lamesteer NWR, a satellite refuge near Wibaux managed by the Medicine Lake staff.
April 8, 1969	Sheridan	6	Berger Pond near Dagmar, northeast of Medicine Lake NWR.
April 1972	Sheridan	2	In a field with about 3,000 sandhill cranes near Homestead.
April 1972	Sheridan	8	Sighted in flight over Medicine Lake NWR with sandhill cranes.
April 2, 1972	Sheridan	12	Medicine Lake NWR.
April 7, 1972	Sheridan	10	Medicine Lake NWR.
April 13-14, 1974	Custer	2	Near Powderville (photograph).
April 13, 1974	Wibaux	6	Lamesteer NWR near Wibaux.
Oct. 12, 1974	Carbon	9	Reported independently by several parties southwest of Billings; at 7 a.m. three miles north of Edgar, at 9 a.m. and 2 p.m. east and southeast of Rockvale.
Oct. 24, 1974	Big Horn	1	Flying over Tongue River Reservoir.
Spring 1975	Wibaux	6	Lamesteer NWR.
April 13, 1975	Wibaux	2	Lamesteer NWR.
Oct. 24, 1975	Sheridan	5	Medicine Lake NWR.
Oct. 27, 1975	Sheridan	4	Near Homestead Unit of Medicine Lake NWR.
Oct. 29, 1975	Sheridan	4	Medicine Lake NWR.
Oct. 30-Nov. 6, 1975	Sheridan	3	Medicine Lake NWR.
Summer 1976	Sweet Grass	1	Near Melville; from the Gray's Lake, Idaho, flock.
April 3-4, 1978	Fallon	2	(T13N, R60E, Sec. 13)
April 23, 1978	Carter	15	About seven miles north of Ekalaka.
April 19, 1979	Roosevelt	6	About 1½ miles southeast of Froid.
Aug. 26, 1979	Broadwater	2	About four miles northwest of Townsend, off the Helena road.
Sept. 24-29, 1979	Sheridan	1	Medicine Lake NWR.

Competition for the money spent on the crane and technical arguments about how to "best" manage the species have also caused some hard feelings.

However, the fact remains that the whooping crane is now in better condition than at any time during this

century. The painfully slow, but steady, increase in its numbers during the last decade has resulted in cautious optimism about the success of the programs and the future of the species. The whooper has become far more than a symbol of our country's continuing commitment to its wild

heritage and endangered species effort. It is also a fine example of a wildlife success story built on persistent and imaginative scientific research, education and the political and personal perseverance and cooperation of many individuals and groups.

continued

Observing Whooping Cranes



Description: Whooping crane—*Grus americana*. Height, 4-4½ feet, wingspread, 7-7½ feet; weight, to 18 pounds. Adults—sexes alike, males slightly larger, broad wings with black tips; black facial markings with a red crown; long neck and long legs; tallest bird in North America. Juvenals (birds through their first winter)—predominantly white, but covered with brownish or buffy-tipped feathers; wings, head and neck show more brown than other parts.

Flight: Fly with neck and feet outstretched, soar and glide, slow deliberate wing beat.

Habits: Except when nesting, they are very social. In Montana, they have been observed roosting and feeding with geese and sandhill cranes. They have been seen eating on open grasslands and in grain-fields, probably on seeds and insects, possibly on small mammals and grass. Very rarely seen migrating in groups of more than 10 or 12.

Sexual maturity: Whooping cranes do not mature sexually until they are 4-6 years old. Sexually immature birds usually do not summer in the nesting area but "wander" and are generally seen as singles.

Birds Confused With Whoopers



Sandhill crane: This is the only other crane seen in Montana. It also flies with neck and feet

outstretched, but is smaller than the whooping crane, seldom exceeding four feet. It is grey, often heavily tinged with rusty brown, and lacks the black markings of the whooping crane. In migration, it is often seen in large numbers of more than 100. Whooping cranes sometimes fly, roost and feed with sandhill flocks.



White pelican: This large bird is white with black wing tips and can be confused with a whooping crane in flight because of the black/white pattern. At close inspection, one can see that pelicans curve their necks in flight, lack the long trailing legs and, of course, have a huge, flat bill and throat pouch which give them a distinctive profile.



Snow goose: Like the white pelican, a white bird with black wing tips. The snow goose, however, is much smaller and does not have the crane's long neck and legs. Quite numerous when migrating.



Whistling and trumpeter swans: They are all white, except for their short legs and feet and their black bills. Lack the trailing legs of the whooping crane.

If You See A Whooping Crane

If you see a whooping crane and would like to help further the understanding of this species' movements in Montana, contact a federal land management agency (U.S. Forest Service, Bureau of Land Management, etc.), a Department of Fish, Wildlife and Parks employee or any member of Audubon chapters in Anaconda, Bigfork, Billings, Bozeman, Helena, Miles City or Missoula. Check your identification, including the time and location, and note any identifying leg bands.

All information will be forwarded to: Dennis Flath, nongame biologist, Department of Fish, Wildlife and Parks, Research Park Building, Box 5, Montana State University; Bozeman, MT 59717 and The Whooping Crane Tracking Project, U.S. Fish and Wildlife Service, P.O. Box 250; Pierre, SD 57501.

Montana's Last Whooper Sighting

One whooping crane (adult plumage) stopped at Medicine Lake National Wildlife Refuge on Monday, Sept. 24, 1979, and stayed until 2 p.m. Saturday, Sept. 29. The bird had a red band with a white stripe on its left leg and a blue band on its right leg. It was first observed by Jay Bellinger and Steve Breeser, manager and assistant manager at Medicine Lake.

According to the U.S. Fish and Wildlife Service's whooping crane tracking office at Pierre, S.D., the bird was banded as a nestling in spring 1978 at Wood Buffalo National Park (in northern Alberta and Northwest Territories) and spent part of July and August 1979 near the Montana border about 15 miles south of Cardston, Alta., just east of Glacier National Park.

This bird was one of the first at the wintering grounds at Aransas National Wildlife Refuge in southwestern Texas, arriving Oct. 7. ■

The Catchall

A Trapper's Story (66,677 ... and still counting)

Miss Ruth Feigel, 50, of Saco, Mont., is a trapper. If you can measure a trapper by the number of animals caught, she just may be the most successful in the state. The last time we visited, in February of this year, Ruth had tallied 66,677 critters, mostly mice. But her trap line is out and she's still counting. . . .

Ruth Feigel's story is more than a tale of a gal with an unusual skill. It's a ray of Hi-Line history peeking through the years. It's a small, everyday Montana wildlife experience worthy of a closer look.

Like many in the northeastern corner, the Feigel family history goes back to homestead times. Ruth's dad, Bob, came out in 1913 from Syracuse, N.Y. Her mother, Beulah, came up from Ashland, Neb., in 1918. The two proved up nearby tracts of land about 16 miles south of Saco in south Valley County. Their places were along a nameless drainage of Larb Creek, down Harb Road from the Harb Post Office. Harb and its post office are gone now, and the Feigel holdings and the homesteads of many of their neighbors today are parts of much larger ranches.

Bob and Beulah met and they were married in 1920; Ruth was born 10 years later. The homesteaders started with a little grain, a little hay, a few cows and lots of dreams and weeds. In 1923, to supplement their income, they began raising vegetables to sell. Even today, commercial gardening is an almost impossible business in northeastern Montana. Over the last half century, less than a dozen families have met the challenges over the long haul. Folks like the Rahlfs, Christianas, Walkers, Sewings, Feigels and a few others are recognized along the Hi-Line and remembered for their gardening efforts. The heavy soil, mostly Bear Paw shale, is either mud, dust or frozen. Vegetables can freeze or be shredded by hail any day of the growing season. Potatoes, beets, beans, turnips, tomatoes, corn, cabbage, squash, pumpkins, strawberries and raspberries have to survive deer, skunks, porcupines, raccoons, a dozen rodents, another dozen birds and a score of different insects. Every year, it's a dice roll.

During the "dirty '30s," Bob and Beulah, like so many, struggled to keep the home place. Bob took a part-time

job singing and selling advertising for the Wolf Point radio station, then KGCX, about 100 miles east. In a Shirley Temple dress, Ruth, billed as "Little Ruthie," then about 4½, would sing with her dad on the air about once a month. Bob Feigel is still locally remembered as the "singing farmer." He also got the nickname "Coo Coo" from the old tune, "They Always, Always Pick on Me," in which he imitated a cuckoo clock. Clearly, there was more corn than what they were growing. But it all helped pay the bills. Working the Hi-Line from the Fort Belknap Agency 208 miles to Williston, N.D., Bob sold vegetables and advertising and entertained. Ruth, her mother and her brother, Elmer, worked the garden.

Ruth's trapping career started in 1947 when she was 17 years old. She had contracted polio as a child. The dreaded, one-time common crippling disease saddled her with heavy braces and a weak constitution, and left her with one leg a little shorter than the other and a patient disposition. As a teenager, Ruth had epilepsy, a disease Ruth's doctors felt was related to her polio and its debilitating side effects. The doctors took Ruth off strenuous farm work for three years, put her on regular medication and prescribed daily exercise.

Loving and practical parents worked out a unique scheme to help their daughter fill the prescription. They staked Ruth to a set of traps and offered her a penny apiece for every mouse caught. Ruth's mother, who has religiously kept a diary since 1936, kept the records and Bob settled up at the end of the year. At first, the day's catch was recorded on a hall or bedroom wall and totaled at the end of each month. Later, the catch was documented daily. Today, 33 years later, the record is still maintained and its history rests in a cardboard box filled with annual diaries.

Bob Feigel passed away in 1976 at 89, and with him went the annual settlement. For 29 years, the price never varied—one penny apiece in spite of recession or inflation. It had become a fixed tradition, and Ruth and her mother enjoy telling how Bob used to teasingly argue that Ruth had to have the whole mouse or at least the head to make a valid claim. Pieces of fur or evidence of robbed traps didn't count, either for the record book

or the penny. Ruth smiles and counters that through the years this has cost her quite a bit of money. It's not at all unusual for magpies, shrikes, foxes, skunks, pack rats and bull snakes to "borrow" a mouse from a hardworking girl.

Meadow mice will sometimes put a foot on the wooden part of a trap, triggering the fine set. Often the sprung trap will hit the mouse on the nose and you'll find the mouse two feet away from the trap, dead. Some rodents are cannibalistic and will eat or otherwise remove the dead among them. Sometimes you can read activity in the dust around the sprung trap—a dead mouse stolen, a penny gone, a tally lost. One can imagine the good-natured speculation and ensuing petty arguments over the years.

Three times in her trapping career, Ruth has caught two mice in one trap. She remembers the first time it happened, a bachelor neighbor saw the catch and, looking out of the corner of his eye and half serious, accused Ruth of trying to fool her ol' dad with a previously caught mouse.

The Feigels moved the 16 miles north to Saco in 1951. Every summer, they would migrate back out to the farm to work the 15-acre garden, maintain the nine shallow wells, keep the buildings up and cut chickweed. In 1970, they sold the home place with the understanding they could use the 10 acres with the garden spot and buildings. Around Saco, Ruth keeps mice out of the Odd Fellows Hall and traps off and on for half a dozen neighbors.

Hard work, outdoor activity and daily exercise have served both Ruth and her mother well and it shows in their tan faces and alert natures. Beulah Feigel, at 83, canned 372 pints of raspberry jam in 1978 and one pint carried off the Grand Champion ribbon at the Northeastern Montana Fair. That's in addition to more than 300 jars of chokecherry, black currant, red currant, thorn apple, crab apple, buffalo berry, plum and citron jams and jellies.

A visit with the Feigels is fun for someone interested in wildlife. Amid dozens of books on wildlife, animal photographs, canning gear, notes, journals, *National Geographic* and *Natural History* magazines and odds and ends from a busy farm life, Ruth will

share her experiences and explain her trapping techniques. In the tradition of trappers the world over, she'll recount the best days, unusual happenings and good times. Her mother will sit shyly by and, although her hearing is no longer the best, she's attentive and backs up her daughter's questions and stories with a good memory.

Few know it, but 1969, according to Ruth, was a bumper year for mice along the Hi-Line. The winter was open and mild, coyote numbers were down, the spring was wet and the summer good for growing vegetables. Early in September, Ruth had the best trapping run of her career. Starting at 1 p.m. and checking her traps before supper, before dark and

winters and better following years with heavy snowfall. Mice seem to run more at night than during the day. Trapping is always better just before a weather change, and usually good just before a storm in any season. Pack rats were much more common during the late 1940s and '50s, and the Glasgow warden, Eddie Dubeau, speculated the rising water level in Fort Peck Reservoir might have displaced the rodent population.

When she first started trapping, Ruth lost quite a few traps to gulls, hawks and shrikes. "You could see them pack the traps away," she said. She soon learned to tether her field traps to a heavy object with a short piece of wire. She has sometimes found the perch of a butcher

gives reluctantly even to disciplined and faithful home gardeners. The Feigel's patience and persistence are exemplified in the character of many Montanans; these traits are part of our heritage and part of our strength.

Ruth Feigel's trapping record is something else. It is unique and offers a rare look at our small mammal resource.

The life histories of most of Montana's small mammals have at least been sketched. Agricultural interests have looked at some extreme rodent problems and worked on small mammal control. Some research has been done on the dynamics of rodent populations. Montana Department of Fish, Wildlife and Parks biologists have studied small mammals in a project related to coal reclamation research. Department researchers are now studying rabbits and rodents as they relate to coyote/deer-predator/prey relationships. The department's nongame biologist has also conducted studies, including an inventory of rodents in a number of counties to try to define their range boundaries.

Not very many people appreciate the role of small mammals in the overall working of our soil, vegetation, and wildlife systems. When one realizes that Ruth Feigel's 66,000-plus rodents were all taken around a garden patch that varied from 15 acres to less than one acre and around a few houses and buildings in the town of Saco, one starts to get an idea of the millions of mice, voles, ground squirrels and other rodents that are out there.

Some ado has been made about how much that living mass eats. Estimates range from one-fifth to one-third of all the vegetation—including food items—produced. No doubt, the small rodents compete with man and domestic livestock, but quite a bit of controversy has surfaced about our existence without them. Little is known about how they spread and help sow and fertilize seeds. Even less is known about the impact of millions of rooting and burrowing mammals on soil development and the moving of soil moisture. It is easy to forget that small animals are themselves food for countless carnivores, reptiles and predatory birds.

The ups and downs of small mammal populations annually affect our agricultural economy and influence our hunting recreation, fur taking and general enjoyment of wildlife. Small mammal populations influence prey numbers and movements, the spread of wildlife diseases and, in some cases, range conditions. As wildlife research matures, more and more attention will be given to the role of these small animals.—Mike Aderhold, Region 6 (Glasgow) information officer



Beulah Feigel and her daughter, Ruth (DFWP photo: Mike Aderhold).

again in the morning, Ruth picked up 106 mice, using about 120 traps. Most came out of a grain field into a pumpkin and squash patch covered with burlap. In May of that same growing season, Ruth picked up 38 mice in a single check of about 130 traps. That's just six short of her all-time high of 44 for one trap line.

Although Ruth has worked as many as 156 traps at one time, her trap line through the years has averaged about 100. The traps are bought in Saco by the half-gross (72 at a time) and "... at a good price," she smilingly admits. Ruth could make an ad for Victor traps—she hasn't used anything else since she started. She says the quality has varied and the wood isn't as good as it used to be, but they still work well. The trip latch can be adjusted and Ruth sets the catch so a breath of air releases it. Ruth remembers that her dad used to trip some of them accidentally and "trap" himself. He could never seem to get them set again, and Ruth's mother says they kidded her husband about not being worth a penny. People used to ask Bob Feigel what they did with all the mice his daughter caught and he would reply, "Why, we eat them!"

Summarizing 33 years of catching mice, Ruth believes rodent trapping is best in the fall, easier during open

bird (northern shrike) with a collection of traps just below it on the ground.

Miss Feigel is not familiar with all of the accepted common names for Montana's mammals, but she believes she has caught 20 or 21 different species. She can describe most of them and tell stories about their habits. Despite her trapping experience, Ruth has never caught a coyote, or set traps for muskrat or beaver!

She has found the best bait is corn, fresh during the summer and dry corn soaked overnight in winter. She has tried cheese, but it dries too fast in the low humidity and processed cheese doesn't attract mice. Peanut butter works, but like cheese it dries too fast and gums up the bait pan. Ruth doesn't care for the new scented or prebaited traps.

"One time some folks named Hill were having a lot of trouble with their cucumbers, so I set a few traps and picked up loads of meadow mice. They were just eating up the field. Another time. . ."

* * * * *

The Feigel family's struggle to outlast the drought and economic Depression of the 1930s has a familiar ring in our state. So does their gritty and dogged determination to raise a crop of vegetables, year after year, in a piece of country that



Montana Wildlife: Sometimes a Nuisance

Montana wildlife is a resource that provides enjoyment for a great diversity of people. The beneficial economic impact to the state from abundant game populations is immense and, in general, most people should be happy with the status of our animal and bird populations. But all good things have some drawbacks and this case is no exception. At times, wildlife can be a real nuisance—and an expensive nuisance at that.

Each year, the Department of Fish, Wildlife and Parks receives many calls and letters from people who are having problems with wild animals or birds. Because of competition with man's interests, wildlife habitat is constantly decreasing in our state and it becomes increasingly difficult for animals to find food and space without encroaching on private property. Department personnel spend many hours and sportsmen's dollars trying to alleviate damage to private property. Harsh winters, such as those in 1977 and 1978, only compound the problem and increase the time and money needed to take care of the situation. But even during temperate conditions, damage control—a necessary evil that is rapidly becoming a year-round chore—is still needed.

Most of the damage control workload is the responsibility of the Enforcement Division, and a great deal of a game warden's time is spent on this activity. Although the image of a warden's duties is that of patrolling in scenic areas looking

for fish and game violators, much of his time is actually spent in much less glamorous endeavors. Damage control can turn into long hours of fairly heavy physical labor.

SUMMER DEPREDAATION

Most complaints received during the summer pertain to either beaver or bear. Beaver control is the No. 1 summer problem, and much effort is expended in trapping and transplanting this furbearer. During the past few years, prices paid for beaver pelts have been down and trappers are able to make more money on long-haired species such as coyote and fox. So, beaver populations have expanded to where they are becoming a real nuisance in many parts of the state.

Game wardens usually use a live trap to catch the animal unharmed and move it to an area where the search for food won't include a landowner's aspen trees that are part of an intricate landscaping plan. Live-trapping beaver takes a considerable amount of both time and energy: A warden must drive out to the damage site, sometimes walk long distances carrying his equipment, make his set and then return early the next morning to check on his success. If a beaver has been captured, he must then transplant it to a new location which might be far away. Beaver live traps are heavy, unwieldy and dangerous. Many wardens have scars from a live trap snapping shut while they were setting it.

Many complaints about bear come

from people using campgrounds, or from those owning orchards or beehives. Turned-over garbage cans, toppled beehives or broken trees in an orchard usually spell trouble for Mr. Bruin. Nuisance bears are often live trapped and transported to areas more compatible to their lifestyle. However, if the bear kills stock or may endanger humans, that bear may have to be destroyed. Thankfully, such incidents are fairly rare. Although danger always exists when a warden handles a bear—especially a disgruntled grizzly—no department employee has ever been seriously injured.

But bear damage control has resulted in many amusing incidents over the years. One concerns a warden who, while inside a trap working on the trigger mechanism, had the door bang shut. He spent a few embarrassing hours peering out of the cage until someone relented and lifted the door to let him out. Another tale describes the frustration of a couple of wardens when they couldn't get a bear to leave the trap after they had transported it to a new area. After trying everything—from backing down a hill with the trap door open and sliding the bear out (only to have it immediately jump back in) to trying to persuade it to leave by pounding on the

side of the trap with hammers—they finally lured it outside, shut the door and drove off with the bear chasing them down the road wanting back in the trap.

During the summer, people also complain about muskrats boring holes in earthen dams and dikes and antelope grazing in wheat or alfalfa. However, these complaints are usually minor and the damage is slight.

FALL DEPREDACTION

Fall damage complaints usually stem from animals or birds feeding in unharvested grainfields. Barley fields seem to attract elk like candy stores draw children. To alleviate damage, wardens often use scare guns. A scare gun operates either on propane or carbide and water. Gas builds up in the chamber and cocks the firing mechanism. When it fires, a spark from a flint sets off the gas and causes a loud explosion. These guns can be set to shoot at timed intervals and are quite effective if the field is not too large and the animals are unfamiliar with the warning sound. If this doesn't work, wardens try other harassment methods. If the situation warrants it, herders are hired to keep the elk out of the fields until harvest is completed. Occasionally, special permits are activated early, before the regular season opens.

In certain areas of the state, ducks and geese cause some fall complaints, usually in connection with pea and grainfields. Control methods are the same as previously described for elk.

WINTER DEPREDACTION

Damage complaints during the winter result in the greatest economic impact on the department and the landowners. Practically everyone who is in the agriculture business has had some experience with game damage and some areas seem to have more than their share of problems. Most landowners view this as part of doing business in a state with abundant wildlife and absorb their losses with no complaints. However, when the price of hay climbs and shortages exist for their own animals, something has to be done.

Haystack damage is the most common complaint during these times. Many control methods have been tried—spraying stacks with a compound offensive to game animals, scare guns, animal-proof fences and herders. Although somewhat successful, each has limitations. Panels constructed from 1" x 4" lumber and used to keep elk and deer away from haystacks have probably proved most successful, but they are awkward for ranchers to handle and are expensive to make and install.

WHAT IS THE SOLUTION?

With continued expansion of recrea-

tional properties, subdivisions and other rural developments that encroach on wildlife habitat, a question about responsibility for the expense and liability caused by wildlife arises. If a commercial operation moves into an area previously used as winter range for elk or deer or it is an area frequented by bear or some other species of wildlife, whose responsibility is it if man and animal are incompatible? Is the landowner responsible for the expense that might occur because he knew the problem existed when he purchased the property? Or should the Department of Fish, Wildlife and Parks spend sportsmen's dollars in an attempt to protect and perpetuate animals in an area now incompatible with domestic enterprises?

In the winters of 1977 and 1978, which were two of the worst on record for game depredation, the department spent thousands of dollars trying to alleviate game damage. A control method used quite extensively now is late hunts. These hunts are effective in isolated areas where damage from deer or elk is occurring on private land. This type of control not only gives the sportsman a chance to harvest some of these animals, but it also proves less expensive in the long run. Admittedly, late hunts are at least partially necessary

because of closed land during the regular season. The best and most palatable solution is proper harvest and herd level management accomplished during the regular season.

Montana is not the only state with game depredation problems. Many methods of control have been tried by neighboring states with varying degrees of success. At least one western state tacks an extra fee on to each hunting license and this is used to pay game damage claims. Many landowners now charge trespass fees to hunters and use this income to help defray the cost of game animals wintering on their land.

No one seems to have a sure-fire solution to the problem of game depredation, especially one that pleases everybody concerned. It is an expensive operation likely to remain with us for many years.—*Bill McKiernan, assistant administrator, Enforcement Division*

Caverns Open May 1

The Lewis and Clark Caverns State Park will again welcome visitors on its traditional May 1 opening day. Guided tours through one of the Northwest's most beautiful caverns are offered daily through Sept. 30.

An information center marks the park's entrance on U.S. Highway 10, 17 miles west of Three Forks. There is a scenic three-mile drive to the visitor center and cafe and gift shop. A campground, several picnic areas and a self-guided nature trail are along the way. The visitor center offers exhibits and tour information.

The two-mile trip through the caverns requires about two hours. Visitors first walk up a developed trail from the visitor center to the cavern entrance where the guided tour begins. Then, descending through the underground caverns, visitors enjoy discussions of cave geology and history while viewing an exotic array of rock formations. A walk back to the visitor center on the exit trail concludes the trip.

Visitors are encouraged to wear sturdy walking shoes, bring a sweater or jacket and include flash attachments for their cameras. Tickets are available at the visitor center at \$2 for adults and \$1 for children (age 6-12). A special group rate of \$1 per person is available for nonfamily groups making reservations two weeks in advance. The cafe also offers group rates for meals.

Additional information is available from the Department of Fish, Wildlife and Parks, Lewis and Clark Caverns, P.O. Box 1024, Three Forks, MT 59752 (406-287-3541).—*Dave Todd, park manager*

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AS THE FIRST RAYS of morning sunlight filtered through the eerie grey clouds streaming overhead, the pickup camper proceeded hesitantly forward. The recent snowmelt and early spring rains had transformed the clay gumbo of the roadway into a greased skating rink, and the three fishermen breathed a sigh of relief as they eased their camper into the fishing access site.

George and his two friends had planned this trip several months in advance. Their headquarters for the next several days would be the Missouri River just above Fort Peck Lake a few miles from the Slippery Ann Ranger Station on the Charles M. Russell National Wildlife Range.

As the three men stepped from the cab of the truck into the cool, damp air, they peered through a hazy fog at the Missouri River. "Old Mo" was just beginning to swell after ice-out, in response to the snowmelt and rejuvenating spring rains. The men were momentarily held spellbound by the brown, turbulent water.

The morning light had become a little stronger by now and, as they looked around the campground, they observed several parties of fishermen beginning to prepare for the day's activities. Already several anglers were lined up along the bank, casting into the roily, silt-laden water. The typical rig consisted of a stiff rod, a heavy-duty reel with star-drag and 50-pound-test line bearing one or two large treble hooks with a heavy sinker near the end.

The three fishermen watched as one of the anglers expertly placed a cast in the river. After allowing the weight to sink to the bottom, he began to retrieve with quick, jerking motions. The angler suddenly hooked something that at first seemed to be a log or other immovable object. Then, the line snapped to life as though some startled monster in the murky water were lashing out with all its strength against an unknown adversary. The reel began to sing with a high-pitched whine as the mysterious giant pulled rapidly away. But, as the big fish turned abruptly with a violent thrashing motion, the line fell limp almost as rapidly as it had taken life. This one had gotten away.

Their pulses quickened as George and his friends hurried back to the



DFWP photo: Mike Aderhold

SPOONBILL

by Rod Berg Like the rivers it inhabits, the paddlefish is strong and powerful—but vulnerable to exploitation. What lies ahead for this ancient fish, the patriarch of the Missouri?

truck for their fishing rods. They would soon join the others in pursuit of Montana's most unusual sport fish—the paddlefish, patriarch of the Missouri.

DESCRIPTION AND STATUS

The paddlefish is one of the most primitive of living fishes. Sometimes called "spoonbill" by local fishermen, it is indeed a unique freshwater fish. Montana paddlefish commonly attain weights of 50-60 pounds, with some exceeding 100 pounds. The largest paddlefish ever caught in Montana weighed 142 pounds, 8 ounces, and was taken in the Missouri River.

The appearance of the paddlefish is unmistakable; its body is grey-blue above, fading to almost white below. It can be distinguished from all other Montana fishes by its elongated, paddle-shaped snout, extremely long gill covers and toothless, sharklike mouth. It has a smooth, scaleless skin and a cartilaginous skeleton.

Paddlefish primarily feed on detritus (organic debris) and plankton; they usually don't eat traditional fish foods such as minnows or worms. They swim through the water with their mouths open and strain out living and dead aquatic organisms by means of a highly developed gill raker system. Because of this unusual feeding adaptation, the only reliable way to catch a paddlefish is by the snagging technique described earlier. The paddlefish, which has poor eyesight, locates its food with abundant sensory organs embedded in the paddle-shaped snout. Early researchers thought the fish used its paddle to stir up food organisms on the bottom, but this was subsequently proved incorrect.

At one time, paddlefish were rather common throughout much of the Mississippi-Missouri River system. However, during the last 100 years or so, paddlefish numbers have declined considerably. A variety of man's influences—including overharvest by commercial fishermen around the turn of the century and destruction of paddlefish habitat in many areas—has contributed to this decline. Dams, because they impede upstream spawning migrations of paddlefish and back water over spawning grounds, have probably been the single most destructive factor con-

tributing to the demise of paddlefish. Other causes of the fish's decline in recent years include intensive dewatering of spawning streams and river pollution problems brought about by an ever-growing human population.

Because of these problems, only six self-sustaining populations of paddlefish remain in the United States today. A seventh population was apparently lost recently with installation of the Harry S. Truman Dam on the Osage River in Missouri. Two of the remaining populations can be found

A second Montana population of paddlefish inhabits the middle and upper portions of Fort Peck Reservoir. Each spring, a portion of this population migrates upstream from the reservoir into the middle Missouri River to spawn. Concentrations of these fish in several portions of the Missouri River below the Fred Robinson Bridge provide another important sport fishery.

In 1976, the Montana Department of Fish, Wildlife and Parks initiated a study to determine the status and life cycle requirements of the Missouri



at least seasonally in Montana.

One of them occurs in the lower Yellowstone River and in the Missouri River below Fort Peck Dam. The majority of these fish apparently migrate upstream each spring from Garrison Reservoir in North Dakota into the Montana portions of the Missouri and Yellowstone rivers to spawn. The paddlefish do not appear to be very selective in choosing a spawning stream, as some fish move up the Yellowstone River one year to spawn and then up the Missouri River the next year. Important sport fisheries for this paddlefish population occur on the Yellowstone River at Intake and on the Missouri River in the dredge cut complex below Fort Peck Dam.

River-Fort Peck Reservoir paddlefish population. Without basic biological information, we felt we could do little to identify potential problems and protect this population from future threats to its survival.

THE MISSOURI RIVER PADDLEFISH STUDY

Each spring following ice-out in the Missouri, paddlefish inhabiting Fort Peck Reservoir begin to move toward the headwaters of the reservoir and upstream into a 207-mile, free-flowing reach of the river. DFWP researchers monitored this migration during the paddlefish spawning periods in 1977, 1978 and 1979. One purpose of the research was to study "timing" of the migration in relation



The paddlefish's complex system of gill rakers (far left) strains plankton and organic debris from the water. The egg mass (left) of this 113-pound female was estimated at between 850,000 and one million. Paddlefish eggs make excellent caviar. Cross section of a paddlefish (below). Except for some bones in the head and tail, the skeleton is cartilaginous (DFWP photos: Mike Aderhold).



to physical conditions such as water temperature and stream flow levels in the Missouri River. The intensity of spring floods in the Missouri River varies from year to year, depending on snowpack, rate of snowmelt and spring rains. Therefore, another objective of our research was to determine relative numbers of paddlefish involved in the runs and to document the extent of their upstream movements in the Missouri River in years with different spring runoff patterns.

Paddlefish migrations were monitored using electrofishing apparatus suspended from booms

mounted on a 22-foot jet boat. Fish entering the field of the electrofisher were momentarily stunned by the current. The boat operators then recorded "census counts" for all paddlefish observed. In addition, some paddlefish were captured in dip nets. These fish were weighed, measured and tagged with a small numbered band fastened around the jaw. Sex and spawning condition were also recorded, and the fish were then released near the capture site.

In 1977, stream flow levels in the Missouri River were considerably below normal during the paddlefish spawning and migration period. Most

of the paddlefish observed in the electrofishing surveys were found within a 25-mile reach of the Missouri River immediately above Fort Peck Reservoir. For optimum spawning, paddlefish require clean-swept gravel bars that are continuously underwater during spring floods. Since few gravel bars of this sort exist in the lower 25 miles of the Missouri River, spawning success was very poor in 1977. Low flows also hindered movement of the paddlefish to choice sites farther upstream.

In 1978 and 1979, stream flows in the Missouri River were near normal, and considerable numbers of paddlefish migrated as far upstream as the mouth of the Marias River 150 miles above Fort Peck Reservoir. The spawning runs peaked during the height of spring runoff in late May when water temperatures were around 50°F.

Researchers identified nine important paddlefish spawning areas as a result of the electrofishing surveys. Although these nine areas encompassed only 38 miles, or 18%, of the 207-mile, free-flowing reach of Missouri River upstream from Fort Peck Reservoir, they contained 83% of the spawning paddlefish. The spawning sites are critically important for maintaining paddlefish populations in the Missouri River and every effort is being made by the department to protect them.

Most paddlefish spawning areas in the Missouri River consist of extensive, silt-free gravel bars. Some sites also contain larger materials such as cobbles and small boulders. The current over these spawning areas is quite swift, and water depth is usually more than four feet.

Most of the spawning activity of paddlefish occurs while they are submerged, but their behavior also involves appearances at the water surface. Spawning paddlefish at the surface agitate the caudal fin several

continued on page 21

A Wonderful Bird Is The Pelican

"A wonderful bird is the pelican,
His bill will hold more than his
belican.
He can take in his beak
Food enough for a week
But I'm damned if I see how the
helican."

—Dixon Lanier Merritt
The Pelican (1910)

What weighs from 10 to 17 pounds; is white; has huge, black-tipped wings that spread eight or nine feet; a long, flat, yellow bill; a great throat pouch; a long neck, perched on top of a robust body? If you answered a "white pelican," you would be 100% correct.

Pelecanus erythrorhynchos flies in orderly lines and alternates several flaps of its wings with a glide. A pelican in flight takes its rhythm from the bird ahead, and they often fly in circles high in the sky, their heads hunched back on their shoulders. Males and females are alike in appearance.

As hard as it may be to believe, pelicans are found along most large waterways in Montana and seem as much at home in the water as in the air. They swim buoyantly and wade in shallows, alert to the possibility of a fish dinner. They feed almost entirely on fish—research indicates they prefer the coarser, more sluggish, species such as carp or suckers.

They breed in several western states; in Montana, they breed primarily at Bowdoin and Medicine Lake National Wildlife refuges. They prefer to nest on islands in large groups on the ground, or in other isolated spots in larger lakes. Here they are fairly secure from their natural enemies such as the fox or coyote.

When breeding, a "horn" or "centerboard" appears on the ridge of the bill of both males and females; it falls off after the breeding season. Two eggs, covered with a chalky deposit, are laid. After incubating for 30 days, the young hatch and are fed by both parents. But the food is not carried in the pouch beneath the bill as many people believe. Instead, the food is stored in the parents' stomachs.



Small, semidigested particles are regurgitated into the pouch and run down to a point near the tip of the foot-long bill. The young thrust in their bills and thus secure their nourishment.

The pouch is used mostly for securing food—when a pelican sees food, it opens its bill, plunging it down and forward. The long, slender sides of the lower jaw bow out and the luckless victim is scooped up. After the scoop, the pelican strains the water out and the contents are swallowed immediately.

Don't confuse the white pelican with the endangered brown pelican that appears on the West Coast. Brown pelicans aren't found in Montana. But when winter comes to the state, the white pelican may be found wintering with its brown cousin—from California to Panama and along

White pelicans (above photo: Danny On), as much at home in the water as in the air, feed almost entirely on fish. Food particles stored in the stomach are regurgitated into the pouch, into which the young thrust their bills to obtain nourishment. Pelicans nest in large groups (DFWP photos: Mike Gurnett).

the Gulf Coast of the United States and Mexico.

Like many birds, pelicans have suffered from thoughtless persecution. Even though they are protected by state and federal laws, these laws alone will not ensure the future of the white pelican. With the proliferation of homes and summer cottages on islands and many isolated spots in large lakes, their breeding grounds are being compromised. Only by attention to the needs of this "wonderful bird" will a spectacular feature of our wildlife world continue to survive. ■

by Vince Yannone



Colstrip: A Pleasant Surprise



With assistance from the federal Land and Water Conservation Fund, Colstrip has avoided the environmental squalor of many energy boom towns (photo: Wirth & Assoc.).

by Ron Aasheim

IN THE CONTROVERSIAL and perplexing world of energy and energy-related development, nearly all sides agree on one fact: Boom towns associated with energy development frequently create severe environmental, social and economic problems. The quality of life afforded by these towns is usually poor, and this is in large measure because of (1) the towns' lack of aesthetic appeal and (2) their lack of recreational facilities and opportunities.

In Montana, the Land and Water Conservation Fund (LWCF)—a federal grants-in-aid program administered by the Department of Fish, Wildlife and Parks (see "Special Parks Issue" of *Montana Outdoors*)—has played a key role at Colstrip, a boom town that does not fit the typical mold. In 1971, the Montana Power Co. and the Puget

Sound Power and Light Co. committed themselves to construction of two 350-megawatt coal-fired power generating units (units 1 and 2) near the community of Colstrip. As a result of this decision, it was apparent that Colstrip would experience rapid, short-term population growth and substantial long-term growth. The companies, along with Western Energy Co., Montana Power's coal-mining subsidiary, were faced with the choice between playing a positive role in the community's development or remaining passive while the community endured haphazard growth. They decided to stay involved, with the ultimate goal of helping Colstrip shape itself into a high-quality living environment.

Planning firms were retained to prepare recommendations for the ultimate development of the community, and these firms quickly pointed out a need for recreation facilities and open spaces within the

community. But it was soon understood that establishing such facilities and spaces would require a great deal of money and land. Western Energy, owner of the townsite of Colstrip, decided that it would provide the land necessary for parks and open space, and would attempt to provide at least the seed money for development of recreation facilities on that land.

At about the same time, Martin White, manager of the Colstrip project, learned of the Land and Water Conservation Fund. Because only political subdivisions can apply for and sponsor LWCF projects and Colstrip was not an incorporated town, White asked the Rosebud County Commissioners if they would sponsor the project. The county—upon assurance that Western Energy would provide the sponsor's share (50%) of the project's costs and would operate the facilities developed—agreed.

When the initial funding request

was received by the Montana Department of Fish and Game (as it was then named), the limitation of LWCF dollars available to Montana and the scale of the proposal led the Parks Division to suggest that Rosebud County seek assistance from the LWCF Contingency Reserve Fund. (This special account, administered by the Secretary of the Interior, is reserved for projects of regional or national significance.)

In September 1975, Interior Secretary Thomas S. Kleppe granted \$526,617 from the Contingency Reserve Fund to Rosebud County, stating: "A joint federal/state/private effort will demonstrate that new mining communities can be model communities." With the 50% match required, the complete project funding exceeded \$1 million. Nearly 10% of the total budget for development of the community of Colstrip was thus committed to parks and open space. This Contingency Reserve Fund grant constituted a precedent, in that all previous grants had been devoted to land acquisition rather than to development.

In July 1979, the project was completed. The 2,000 residents of Colstrip now enjoy a six-lane Olympic swimming pool, a wading pool, three tennis courts, three basketball courts, five playgrounds or tot lots, numerous picnic areas, two softball or little league fields and other multipurpose fields. In addition, several acres have been landscaped and improved to accommodate more passive forms of recreation. In all, 50 acres—or roughly 25% of the town of Colstrip—is dedicated to parks and open space.

In addition to the facilities financed by the LWCF, a community center has recently been completed. That center—which includes a gymnasium, handball/racquetball courts, weight rooms, saunas, locker rooms, multipurpose rooms and a kitchen—was made possible by donations of dollars and labor from the Western Energy Co. and the residents of Colstrip. Fishing, nonmotorized boating and picnicking are also available at Castle Rock, a 157-acre reservoir just west of Colstrip developed by the Western Energy Co. to meet domestic and industrial water needs. Schools, medical facilities, housing, commer-



Fifty acres, or roughly one-fourth the town area of Colstrip, has been dedicated to parks and open space. Facilities include swimming and wading pools (DFWP photo: Ron Aasheim), tennis and basketball courts, playgrounds, picnic areas, softball diamonds and multipurpose fields (photo: Wirth & Assoc.).



cial services and churches, also envisioned in the original plan, are now part of the reality that is Colstrip.

Colstrip is unique among energy towns and the quality of the community affects the attitude of its residents. A recent U.S. Bureau of Mines study comparing four large surface coal mines found that Colstrip had the highest labor productivity and was also the most efficient. The labor turnover at the Colstrip mine is between 1% and 2% annually, far below the national average. Contrast this with conditions in energy towns such as Rock

Springs, Wyo., where job turnover rates sometimes exceed 50% annually.

For its contributions to the quality of life in Colstrip, the Western Energy Co. received two national awards in 1978: the Denver Federal Executive Boards Award for Achievement in Socioeconomic Improvement, and the National Association of Home Builders and Better Homes and Gardens Sensible Growth Design and Planning Grand Award.

Take time to stop in Colstrip next time you're in the area. Chances are, you'll be pleasantly surprised. ■



❧ JOIN OUR TREASURE HUNT ❧

Have you ever seen a pair of deer silhouetted against the purplish glow of a Montana sky at dusk? Sensed the sounds, colors and smells of a favorite duck hunting haunt on a chilly fall morning? Or faced the challenge of a whitewater stretch on one of Montana's wild rivers?

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Send your check to: *Montana Outdoors*, Dept. of Fish, Wildlife and Parks; Helena, MT 59601, or use the handy envelope in this issue.

Readers Respond

The Money Hunters?

With the high prices being paid on coyotes and other furbearers, a new breed of hunter has arrived. We now have the money hunter.

He flies around in a helicopter or plane or drives a snowmobile; he runs cattle through fences; he has no idea whose land he's on. His excuse is that he's helping the rancher. He's truly helping no one but himself.

I've hunted coyotes for years in Montana and I've seen a big decline in populations over the past three years. It wasn't too many years ago, a sportsman could go to a rancher and request to hunt coyotes and have no fear of being turned away. Some ranchers were so tickled, they would offer to pay so much per coyote or fill your gas tank. But you were always asked in for coffee or supper.

Now that the money people are in on it, the game has changed. As you can see by the following newspaper clipping, a few have ruined it for all:

No trapping
No predator calling
No hunting
No sno-cats
No cross country skis
No trespassing
On land owned or leased
by the undersigned:
[signatures]

I'd like to propose a ban on all aerial hunting and stronger control on snowmobile hunting. I'm sure the coyote will survive the onslaught of the money hunters (he's smarter than they are), but I'm not sure the sportsman will.

Let's pull together for better land-owner/sportsman relations. If you see a violation, get the plane's number and report it to the rancher or to a warden. Let's win this one for the little guys.—*Tony Garibaldi; Bozeman, Mont.*

Magazine Lacks Objectivity

I do not wish to renew my subscription because I do not feel your magazine has been properly objective in reporting news concerning wilderness and land withdrawals. Your articles and editorials tend to be pro-wilderness and anti-

development. I work for a sawmill and feel very strongly that there is enough wilderness in Montana at present.

Many of your articles are excellent and I am going to miss reading them. I hope you will consider trying to be more objective on this wilderness issue so I can again enjoy your magazine.—*Michael Lyngholm; Dillon, Mont.*

Sled Dog Equipment

I thought the readers of *Montana Outdoors* interested in the sled dog sport (see "More Than Man's Best Friend," Nov./Dec. 1979) might want to know that they can find good equipment right in our own state. In our northwestern area, we have a large number of enthusiasts.

Here are some of the Montana dealers:

Zima Products, Kila, MT 59920—harnesses, towlines, collars.

Neff's Animal Specialties, 2307 Stephens, Missoula, MT 59801—harnesses, collars, all general working and sporting dog gear.

Adanac, 4108 Highway 93 N.; Kalispell, MT 59901—racing and freight sleds, snow hooks.

All are happy to assist beginners in choosing suitable gear.—*Mel Fishback; Kila, Mont.*

Restoration of Faith

Thank you for responding to my letter and refunding my \$5 which I mistakenly overpaid you for a subscription. I was beginning to lose hope of getting a response, because you must have a huge volume of mail and more important things



BLEST BE THE BINDER THAT TIES . . .

a year's supply of *Montana Outdoors* together. And does so handsomely—a rich brown leatherlike cover, gold lettering, the magazines held securely in place.

And for only \$5. Even parsimonious souls would be hard pressed to come up with a more thrifty, efficient way to protect and preserve an entire year of our timely, thought-provoking issues.

For each personal or gift order, send \$5 to: *Montana Outdoors*, Department of Fish, Wildlife and Parks; Helena, MT 59601.

to be concerned about. But you've restored my faith in Montana government, especially the Department of Fish, Wildlife and Parks.

I do like your magazine and want to commend those who work on it. I'm with those who think the quality of life is inseparably linked with our natural resources. Therefore, I support those policies which would preserve our wilderness, limit pollution and facilitate the enjoyment of God's great outdoors for larger numbers of people through the expansion and upgrading of state parks and such.—*Mel Gohdes, Holy Cross Lutheran Church; Eureka, Mont.*

Protect Kootenai Falls

Pat Graham couldn't have said it better in his Sept./Oct. 1979 article, "The Timelessness of Thunder Dancing."

Kootenai Falls and the canyon below is truly an irreplaceable resource which should be properly protected.—*Al Bratkovich; Libby, Mont.*

Church in the Wilderness

I never fired a shot when I hunted in your great and beautiful state last year, but our camp had good success on mule deer—which I saw, but didn't shoot. I was hunting for elk and saw one cow.

We were hunting in the Moose Creek area out of White Sulphur Springs and I have to say it was the most scenic hunt I've ever been on. I've hunted in Canada, Wyoming and Michigan and, to me, Montana was it.

The local people were some of the best I've met. To a person, they were helpful and friendly.

Walking back down the mountain was the most thrilling part of the hunt. The surroundings made us all feel pretty small. If the Good Man upstairs ever made a church in the wilderness, it had to be Montana.

I hope to be back next year.—*Robert E. Wolfe Sr.; Omro, Wis.*

Use, Preservation Both Possible

As a former resident of Kalispell, I've spent many hours attempting to land the "big one" from the streams and lakes which abound in that area. For that reason, I must commend George Holton and Glenn West for their fine work ("Fishes of Special Concern," Jan./Feb. 1980).

Mr. Holton alerts us all to the "early warning system" that will allow us to maintain the wide and varied number of fish species native to Montana. As a professional forester, I am constantly dealing

with the compromises that must be made to both use and preserve what nature has given us. Articles like Mr. Holton's will alert us to potential problems in time to solve them. We'll still be able to enjoy the thrill of landing the "big one"—whether it be an eight-foot sturgeon or an eight-inch brook trout.—*Mark H. Johnson; Lewiston, Idaho*

Book Reviews

THE BANTAM GREAT OUTDOORS GUIDE TO THE U.S.A. & CANADA, THE COMPLETE TRAVEL ENCYCLOPEDIA & WILDERNESS GUIDE, by Val Landi, Bantam Books, Inc., New York, 1978, 854 pages, \$12.95 paper.

Billed as a reference book, this text is all that and then some. It is easy to see why Val Landi, a contributing editor of *Outdoor Life*, is called one of the nation's leading outdoor authorities. In this book, he lists region by region, state by state, in an "A-Z" format, an encyclopedia of outdoor recreation services and activities, followed by a travel and recreation guide to locations. Within this list, however, he has also managed to provide armchair voyagers with some very interesting reading, as well as useful facts on hunting and fishing the out-of-the-way places and exploring American and Canadian wilderness and backcountry.

I found one of the most useful features of the text was the hundreds of reproductions of actual maps, guides and information pamphlets available to the public on fishing, hunting, camping and wilderness travel. Addresses are also given for obtaining these maps, and their price, if any, is listed. As if this were not enough, literally thousands of names and addresses are also listed for local guide services, resorts and outfitters. This kind of information can really help you find what you need in a hurry.

Landi has increased the attractiveness of the book by including many beautiful and well-chosen sketches, region maps and a center section of full-color, shaded-relief maps of selected major outdoor recreation areas. But unlike the touristy, promotional travel guides that we see so often, the "Great Outdoors Guide" tells it like it is with sections such as "Weather, Bugs and Beasts," written not so much to frighten the traveler (i.e., timber rattlesnakes and copperheads are found through the rocky forest areas) as to prepare him for getting out into and amongst nature, if he so desires.

However, even a reference book of this magnitude and scope, requiring over five years of research and preparation, is not immune from criticism. The reader can

sometimes get lost in the encyclopedia since subheads are not easily distinguishable from main headings and are not always in alphabetical order. Although the maps are interesting, they are not really of much practical use or information value. In fact, a warning is given to readers to send for an appropriate map with which to plan their trip.

Also, as might be expected in a book requiring so long to prepare, information and prices are sometimes inaccurate or out-of-date. For example, in the Montana section Landi states that northern pike weighing up to 30 pounds are found in the Flathead River. A few pages later, he contradicts himself with the statement: "Lone Pine Reservoir contains the only northern pike in western Montana." Similarly, although his historical anecdotes are always interesting, they are not always accurate. For example neither the Hudson's Bay Co., Manuel Lisa nor John Colter were ever known to frequent the Missouri River nor did Chief Joseph forge a trail near Granite Peak.

One of the biggest disappointments to me was the book's preoccupation with selected national forest lands to the near exclusion of many other public lands and facilities provided by such agencies as the Bureau of Land Management, U.S. Fish and Wildlife Service, Corps of Engineers, Bureau of Reclamation, National Park Service and state parks and fish and game departments.

But what Landi loses in facts and completeness, he makes up for in readability and local interest. Unique out-of-the-way places such as Park Lake in Montana's Helena National Forest are mentioned. He tells you what flies are popular for Maine salmon. His description of the Daniel Less homestead in the Okefenokee Swamp almost makes you homesick—even if you've never seen the Okefenokee!

Landi's perfect description of the ginclear streams of California's Trinity Alps brought back memories of days spent along the now-flooded Trinity River catching steelhead smolt in my hands and of nights so dark I couldn't see my hand in front of my face. His statement that trophy grizzlies are found in Alberta's Swan Hills I could also accept as fact, because I still remember the huge grizzly track I saw there once—with a wolf track inside of it!

In summary, the book is interesting, thorough, well indexed and includes a bibliography of rare and interesting books on description and history of our wildlands—books that give you the feeling of the country, rather than mere information. The "Great Outdoors Guide" is a book like that.—*Dave Conklin, Region 7 (Miles City) parks manager*

SPONBILL *continued*

times, then disappear after a few seconds. Spawning sites can be identified by continual appearances of paddlefish surfacing in one place. Spawning can then be verified by searching for paddlefish eggs with scientific equipment.

It is believed that one or more male paddlefish accompany each female that has attained reproductive readiness. When the female begins to release her eggs over the spawning site, the males position themselves beside her and release clouds of milt to fertilize the eggs. Immediately after fertilization, a sticky coating forms on the eggs, causing many of them to adhere to pebbles and rocks on the spawning bars. The strong current over the gravel bars allows the eggs to develop normally. Without it, silt smothers the eggs before development can proceed to the hatching stage. Some of the eggs are swept downstream and coated with debris before becoming attached; many of these eventually suffocate in silt-laden sites.

Paddlefish eggs are about 0.1 inch in diameter, and an average female carries approximately 250,000 eggs. The eggs usually hatch within 7 to 10 days, and the new larvae are about 0.4 inch long. Reproductive success of paddlefish has been confirmed on a number of Missouri River spawning sites by capturing these larvae in fine mesh nets towed from boats traversing the river downstream from the spawning bars.

When hatched, the small paddlefish do not have the elongated paddle so characteristic of adults. Young paddlefish begin to look like their parents after about a month, when they are approximately two inches long. They swim around in large circles searching for tiny zooplankton that constitute their food. Paddlefish grow rapidly during their first few years of life; they average about three feet in length by the time they are 4 years old. Growth slows considerably beyond this age. Paddlefish lay down annual growth rings in their cartilaginous skeletons similar to the growth rings in a tree. We determined the ages of about 200 Missouri River paddlefish by counting these rings in cross sections of the lower jaws of fish harvested by

fishermen. Ages of these fish ranged from 7-28 years, with the majority of them between 11 and 23 years old. The absence of younger paddlefish in the spawning run is explained by the fact that paddlefish are not sexually mature until they are quite old—7-8 years for males and 12-14 years for females.

Another aspect of our paddlefish studies on the Missouri involved following the movements of individual fish in response to changing stream flow conditions in the river. How much water is required for paddlefish to negotiate various shallow water areas that may act as natural barriers to paddlefish movement during low flow periods? How do in-

biotelemetry studies will aid in better determining the life cycle requirements of paddlefish in the Missouri River.

FUTURE OUTLOOK

As mentioned earlier, paddlefish have already disappeared from or undergone drastic declines in many portions of their former range. Unfortunately, several of man's activities still pose a real threat to paddlefish in the Missouri River and other areas.

A federal agency has recently proposed to study the feasibility of several dam sites on the Missouri River between Fort Benton and Great Falls. If these dams were constructed,



This paddlefish without a paddle was caught in a net while fishery workers were conducting research in the upper dredge cut near Fort Peck Dam. There was no indication the fish had been recently injured. Fishery workers weighed, measured, tagged and then released the paddlefish (DFWP photo: Mike Aderhold).

dividual paddlefish respond to reductions of flow during the spawning migration?

We hope to answer these and other questions in the near future with the aid of biotelemetry studies. Biotelemetry is the technique of studying the movement patterns of an animal by following signals from a miniature radio attached to the animal. We are currently testing the feasibility of using telemetry for studying the Missouri River paddlefish. Several kinds of radios are being tested to find the one most suitable for our purposes. Some radios are being attached externally to the cartilaginous paddle of the fish, while others are being surgically implanted in the abdominal cavity. In combination with information gained from the electrofishing surveys,

they would partially or completely regulate flow levels in the Missouri River. This could be harmful to the paddlefish, which require rapid increases in water level during spring runoff to stimulate spawning runs. Changes in channel configuration below the dams, as a result of the altered flow patterns, would probably destroy several spawning areas presently utilized by paddlefish. In addition, the dams would inundate a significant portion of the free-flowing Missouri River that may contain spawning sites.

Our nation's present energy crisis poses another potential threat to the paddlefish. Development of the vast coal reserves of eastern Montana has been suggested as a partial solution to the energy problem. If synthetic fuel plants or more electric power-

generating facilities are built in eastern Montana to utilize this coal, massive amounts of water will be required for cooling. The likely source of much of this water will be Montana's Yellowstone and Missouri rivers. Since paddlefish spawning runs are triggered largely by spring floods, withdrawals of water from the Yellowstone or Missouri during this time could be very detrimental to paddlefish. Measures must be taken

to ensure that adequate flows are maintained in these rivers for the paddlefish spawning runs.

Like the Missouri River itself, the paddlefish is strong and powerful, but vulnerable to exploitation. Unless its remaining habitat is protected, this ancient fish will continue to decline. If the paddlefish is allowed to go the way of the passenger pigeon, Montana will have lost a unique part of its natural heritage. ■

Contributors

"Is Its Number Up?" Yes, in terms of total population. At the end of 1979, at least 118 whooping cranes existed in the world. In fall 1941, only 15 whooping cranes migrated from northern Canada to the southwestern coast of Texas. But efforts to protect the naturally nesting flock of whoopers during their migrations, and restrictions around their summering and wintering areas; a cross-fostering program at Gray's Lake, Idaho, where whooping crane eggs are placed in sandhill crane nests; experiments with a captive population at Patuxent Wildlife Research Center in Maryland, and the work at the International Crane Foundation in Wisconsin—all of these efforts have resulted in "cautious optimism" about the success of the program and the species' future. As **Mike Aderhold** writes: "The whooper has become far more than a symbol of our country's continuing commitment to its wild heritage and endangered species effort. It is also a fine example of a wildlife success story. . . ." Aderhold is the department's information officer for the Glasgow region. He is an avid bird-watcher and for the past several years has served as compiler for the Fort Peck Christmas Bird Count. Turn to his article on page 2.

Rod Berg calls the paddlefish "Montana's most unusual sport fish." Since they commonly weigh 50-60 pounds—with some exceeding 100 pounds and the state record weighing over 140 pounds—few fishermen would dispute his claim. As Berg writes, paddlefish were once quite common throughout much of the Mississippi-Missouri River system. But in the last 100 years, their numbers have declined because of over-harvest, dams impeding their upstream spawning migrations, dewatering of spawning streams and river pollution. In 1977, Berg and other Department of Fish, Wildlife and Parks researchers began monitoring paddlefish migrations on the Missouri. To learn more about their

study and to discover what the future might hold for this "patriarch of the Missouri," turn to "Spoonbill" on page 11. Berg is a fisheries biologist for the department's Ecological Services Division.

It weighs anywhere from 10 to 17 pounds. Its huge, black-tipped wings have a spread of eight or nine feet. It has a flat, yellow bill and a long neck perched on top of a robust body. Its most notable feature, however, is probably its great throat pouch. These clues are probably sufficient for nearly anyone to correctly identify the white pelican. However, most people are surprised to learn the pelican is found along most large waterways in Montana. But as **Vince Yannone** writes: ". . . Pelicans have suffered from thoughtless persecution. . . . With the proliferation of homes and summer cottages on islands and many isolated spots in large lakes, their breeding grounds are being compromised." Indeed, "A Wonderful Bird is the Pelican," and only by attention to its needs will this spectacular feature of our wildlife world continue to survive. Well-known for his television appearances and work with youth education, Yannone previously served as the department's hunter safety coordinator and as a biologist with the Montana Wildlife Research Unit. Turn to his article on page 14.

Most boom towns associated with energy development suffer from severe environmental, social and economic problems. The quality of life is usually poor, because the towns lack aesthetic appeal and have no recreational opportunities for the residents. Such is not the case with "Colstrip: A Pleasant Surprise." Colstrip's 2,000 residents now enjoy an Olympic-sized swimming pool, a wading pool, tennis courts, basketball courts, a community center, playgrounds, picnic areas, softball and other multipurpose fields and acreage

designed to accommodate more passive forms of recreation. **Ron Aasheim** writes that about 25% of the town of Colstrip is dedicated to parks and open spaces. How did all of this become reality? Through the cooperation of Western Energy Co., the Land and Water Conservation Fund, Colstrip residents and other organizations and individuals. For a look at a unique energy town, turn to page 16. Aasheim is a program manager in the department's Parks Division

When a certain J. A. Poppe left Germany in 1872 bound for California with a cargo of 83 carp, he had no idea what the consequences of his venture might be. Only five carp survived the journey—yet today, carp are common residents of the warmer rivers and lakes in nearly every state. As **Steve L. McMullin** writes, the carp offers "a telling example of what can happen when an exotic (alien) species is introduced into waters beyond its natural range." He also cautions anglers that "Exotic Introductions" can become "A Fishery Manager's Headache." McMullin is a fisheries biologist working out of the department's headquarters in Kalispell. His present assignment is a project assessing the impacts of peaking operations at Hungry Horse Dam on fish populations in the Flathead River. He was previously employed as a sports writer. Turn to his article on page 23.

Originally scheduled for publication in our Jan./Feb. 1980 issue devoted to "The Riddle of Existence," **Ken Walcheck's** incisive, patient research on the prairie chicken is a welcome addition to this issue. From personal interviews, diverse paragraphs in old newspapers, fragments of narrative reports at the Medicine Lake National Wildlife Refuge and other sources, Walcheck has pieced together the fascinating story of the prairie chicken in Montana. Nobody is really certain when it came and when it left. But its departure marked "The Start of a Silence." Probably *Montana Outdoors'* most frequent contributor, Walcheck continues his duties as the department's information officer in Miles City. He previously was an assistant professor of biology at Northern Montana College in Havre and worked as a ranger/naturalist with the National Park Service in Mount McKinley, Yellowstone and Crater Lake National parks. Turn to his article on page 25.

MO extends special thanks to a new contributing artist Jeff Oens of Helena. In this issue, his pen-and-ink illustration of a whooping crane accompanies "The Editor's Column." A pen-and-ink of a bighorn sheep accompanied "The Director's Column" in our Jan./Feb. 1980 issue.

WHEN J. A. POPPE left Germany in 1872, destined for California with a cargo of 83 carp, he had no idea what the consequences of his venture in importing would be. He only hoped to make a profit by supplying California markets with the popular European food fish. When only five carp survived the journey, chances for the success of Poppe's venture seemed dismal; but the warm California climate proved ideal for the survivors. Carp (*Cyprinus carpio*) had never before existed in North America; yet just 10 years after their arrival, they were being sold in California markets for a little over a penny a pound. Today, carp are common residents of warmer rivers and lakes in nearly every state.

The introduction of carp to the North American continent, and that fish's subsequent proliferation, offer a telling example of what can happen when an exotic (alien) species is introduced into waters beyond its natural range. If the environmental conditions are right, the exotic species can multiply rapidly.

The remarkable ability of the carp to adapt to a new environment is best illustrated in the Columbia River. Captain John Harlow introduced the fish to the Pacific Northwest in 1880. He bought 35 yearling carp for \$5 each and transported them to Portland, Ore. After displaying them—as the “wonder fish from Europe”—in a public market, he planted the carp in a pond on his property. During the spring flood of 1881, offspring of Harlow's 35 fish (roughly 3,000 after only a year of breeding!) escaped into the Columbia River. By 1893, commercial fishermen were offering carp as farm fertilizer at \$5 a ton.

Montana's first carp arrived from Washington in 1886. Carp were introduced on both sides of the Continental Divide. The few lakes west of the divide into which they were introduced were later rehabilitated so that today carp are restricted to the Missouri and Yellowstone drainages in Montana.

In the late 19th century, the carp was so widely esteemed as a source of cheap and abundant protein that it was stocked indiscriminately. Immigrants from eastern Europe brought with them a taste for the

flesh of carp. The carp is still a popular food fish in Europe. In fact, worldwide more carp are raised for food than any other fish species (most Montanans would be surprised to learn that the flesh of carp, suckers and most Cypriniformes [minnows] is quite tasty, albeit bony). The mania over carp even reached the point where, according to Dr. R. J. Behnke of Colorado State University: “Miners in Nevada pleaded to have carp sent to them so they could stock their waters with this fine new fish

exotic introductions. Although the potential exists for using introduction of certain exotics as a management tool, the risks involved are great, and fishery managers are justifiably reluctant to experiment. In Montana, fisheries management emphasizes preserving and enhancing wild fish populations: Therefore, primary concern is given to populations of native fish.

Montana is blessed with great riches in native game fish. The list includes three species of sturgeon; two



Exotic Introductions: A Fishery Manager's Headache

by Steve L. McMullin

they had heard so much about.” Because native trout (Lahonton cutthroat, now a threatened subspecies) sold for the then-outrageous price of up to 40 cents per pound, the miners promised to “do their best to control the trout population and make the waters safe for the carp.” Not until after the carp was well established all over the continent did people begin to notice its undesirable impacts, such as alteration of habitats and the resultant negative impacts on native species.

Fishery managers learned, from this and a few other costly experiences, to take a cautious view of

species of whitefish; cutthroat, Dolly Varden and lake trout; grayling; sauger, and channel catfish. In addition, northern pike are native to the Saskatchewan River drainage in northeastern Montana (all other northern pike populations in Montana are introduced). A third species of whitefish may be native to Montana, and recent studies indicate the rainbow trout is native to the Kootenai River below Kootenai Falls.

Like many other states, Montana has had many exotic fish species introduced into its waters. Several of our most popular Montana game fish, in fact, are transplanted aliens

—including brown, brook and golden trout; coho and kokanee salmon; walleye; largemouth and smallmouth bass, and several species of sunfish. But because of the rich native fish fauna, the Department of Fish, Wildlife and Parks maintains an especially cautious attitude toward exotic species. According to Fisheries Division Administrator Art Whitney: “We would not recommend the introduction of an exotic species unless its potential for improving fishing was extremely high and its potential for causing damage was almost nil. Needless to say, very few species can meet both of these criteria.” George Holton, assistant administrator of the Fisheries Division, explains: “We have one of the finest fisheries, particularly cold-water fisheries, in the nation and we don’t want to jeopardize it with introductions that have not been thoroughly tested elsewhere.” Holton adds: “Rainbow, brown and brook trout have been desirable introductions in many places. However, if we were starting all over again with a pristine Montana, we would be more cautious about introducing them where they would be detrimental to native species.”

Over the eons since life began, fish and other animals and plants have worked out a delicate balance. That balance is maintained because all the organisms divide the environment, in a complex but stable way, into *niches*. A niche is not simply a spatial or territorial slot, but consists of all the resources a particular species uses. Each species has its own niche and, as a result, usually there are enough resources (such as food and living space) to support all the native species in a given environment. However, the number of potential niches into which any environment can be divided is limited. If an exotic species is introduced and all of the available niches are filled, the result is competition between the exotic and one or more of the native species—and the delicate balance of nature is upset.

In evaluating the pros and cons of introducing an exotic species, the fishery manager must use his ecological knowledge of the particular lake or stream. He must consider the life history of the species to be introduced, as well as the life

histories of the various native species already present. He must be cautious. Even then, it is easy to make a mistake.

Such a mistake was recently made by fishery managers in Idaho, Montana and other states, when they introduced the opossum shrimp, *Mysis relicta*, into several lakes. The purpose of this introduction was to provide a larger food item for kokanee salmon. When kokanee feed on *Mysis*, as they do in the western arm of Kootenay Lake in British Columbia, they grow much larger than the average of 10-12 inches attained under other conditions. But the Kootenay Lake situation, it now appears, is exceptional; an up-welling of water in the western arm carries *Mysis* from deep within the lake up closer to the surface where kokanee can eat them. Planted in other lakes, *Mysis* actually seems to be responsible for *declines* in kokanee populations. Although it has not yet been proved beyond doubt, *Mysis* in these lakes appears to compete with kokanee, and with the microscopic animals upon which the kokanee feed. Because the shrimp spend most of their time in the very deep portions of any lake, few of them ever fall prey to kokanee. Unfortunately, this wasn’t known until after *Mysis* had been planted in other lakes.

Fisheries managers occasionally create their own headaches with such miscalculated introductions, but their biggest headache by far comes from

Wildlife Shorts

Hummingbirds appear only in the Western Hemisphere.

* * *

The wingspread of some fossil insects exceeded 27 inches; the modern maximum seems to be the 10-inch wingspread of the Atlas moth.

* * *

Until the end of the Paleolithic period, more than 3,000 years ago, all of mankind probably depended on foods which “grew” naturally—wild animals, herbs or both.

* * *

Basically, grass is a form of vegetation that thrives where annual precipitation is too scanty to support tree growth.
—Vince Yannnone, youth educator

the well-intentioned, yet uninformed, angler who illegally introduces an exotic. There are many examples of anglers creating havoc by illegally planting their favorite fish into a lake or stream where those fish had not existed before. One such instance has resulted in establishment of northern pike in the Clark Fork River drainage.

The first official record of northern pike in the Clark Fork drainage came from a 1959 gill net sample in Lone Pine Reservoir near Hot Springs. Following that discovery, a fisherman admitted to planting 12 pike in the reservoir in 1953. By 1961, pike were found throughout the Little Bitterroot drainage and were probably already in the Flathead River. Subsequent reports of pike taken by fishermen and DFWP personnel indicate substantial increases in pike populations, due both to natural multiplication and to further illegal plants. Self-sustaining populations of pike are now found throughout the Flathead drainage, both above and below Flathead Lake. They have encroached downstream in the Clark Fork River at least as far as Lake Pend Oreille, Idaho. At least two lakes in the Kootenai River drainage now contain pike.

A voracious predator, the northern pike is unpopular with fishery managers when it invades prime trout streams and lakes. Biologists in Washington and Idaho are now concerned that pike will eventually find their way into the Columbia River, where they could have adverse impacts on salmon and steelhead fisheries.

Like J. A. Poppe importing his carp, the angler who illegally plants fish usually has no idea of the potential impacts of his actions. But those impacts can be far-reaching. Montana is in the unique position of being the birthplace of three great river systems: the Missouri River system; the Saskatchewan River System, and one major branch of the Columbia River system. For that reason, a fish species introduced in Montana could end up anywhere from Louisiana to Hudson Bay, or from Missouri to Washington State. That sort of responsibility is not to be taken lightly—by the fishery manager or the sportsman. ■

The Start of A Silence

by Ken Walcheck



graphics: courtesy of South Dakota Dept. of Game, Fish and Parks

A BITTER DECEMBER wind screamed out of the north and the outside thermometer at the Medicine Lake National Wildlife Refuge was holding at 30 below zero. I decided to look through one more narrative report in my search for documentations of prairie chickens on the refuge, then call it quits for the day. And that's when I found it. Excitement surged through me—I couldn't believe I had found the material for which I had so tediously searched.

"Was the prairie chicken native to the state, and were there huntable populations?" are two questions guaranteed to produce lively debate and a wide array of answers whenever the topic of upland game birds arises. But the question of whether the prairie chicken was a *bona fide* Montana resident has never been adequately explored or answered.

When the Lewis and Clark Expedition entered what is now Montana, the explorers were impressed with the richness of the prairie environment as wildlife habitat. Yet, the prairie chicken was one species not listed in their growing catalog of wildlife species for the region. Their journals show only one significant entry referring to the prairie chicken. On Sept. 2, 1804, near Yankton, S.D., William Clark wrote: "I saw 4 prairie fowls Common to Illinois, those are the highest up which have been seen."

And it was the "highest up" the Missouri River they would see them: At that time, prairie chickens did not yet

inhabit either North Dakota or Montana; any mention of them before 1890 by hunters, trappers, settlers or historians refers instead to sharp-tailed grouse. When we compare Lewis' and Clark's remarks about the "prairie fowls Common to Illinois" (prairie chicken) with comments about the "pointed tail prairie hen" seen near the mouth of the Musselshell River, and particularly with their description of the grouse that is "Perculiary the inhabitant of the Great Plains of the Columbia," it becomes clear they recognized the distinctions between the prairie chicken and the sharp-tailed grouse.

The original range of the greater prairie chicken, *Tympanuchus cupido pinnatus*, stretched across the tall grass prairies of the eastern Great Plains, eastward to Kentucky, Ohio and Tennessee and northward into Michigan, Wisconsin, Minnesota and eastern South Dakota.² Robert E. Stewart, author of "Breeding Birds of North Dakota," speculated that the absence of greater prairie chickens in the more westerly plains was due to grazing pressure from large herds of buffalo that roamed over the region.³ Following disappearance of the buffalo, a grass cover conducive to prairie chickens flourished, and they expanded their range into North Dakota, Nebraska, Kansas, Oklahoma, the southeastern corner of Wyoming, northeastern Colorado and the prairie provinces of Manitoba, Saskatchewan and Alberta.

In addition to the greater prairie chicken, three other

ances (forms not different enough to be judged distinct species) of prairie chickens are known: the heath hen, *T.c. cupido*, a northeastern seaboard form which became extinct in 1932; the Attwater prairie chicken, *T.c. attwateri*, currently limited to the Texas coast and in danger of extinction, and the lesser prairie chicken, *T.c. pallidicinctus*, now limited to arid grasslands of southeastern Colorado and southwestern Kansas, southward through Oklahoma to eastern New Mexico and northwestern Texas.

Only remnant patches of the prairie chicken's original and acquired range exist today. Fred Hamerstrom, one of the country's leading authorities on prairie chickens, estimated in 1959 that only about 15% of their original range was still occupied by the birds.⁴ Since then, prairie chicken habitat has further deteriorated and attempts at restocking in certain areas have not been successful.

Documentations of prairie chickens in the late 1890s and the early 1900s for various localities in western North Dakota and their respective distances from the Montana state line included Beach (2 miles), Marmarth (5 miles), Medora (25 miles) and Williston (17 miles).

As the agricultural movement with its belching steam engines and threshing machines swept into Montana, so did the prairie chicken. According to K. Ross Toole, professor of history at the University of Montana in Missoula, homesteaders had filed claims on nearly 5 million acres by 1910. During that same year, more than a quarter million acres was planted in wheat; by 1919, this figure increased 14 times, to 3.5 million acres.⁶

In my search for information on the prairie chicken in Montana, I corresponded with and talked to numerous old-timers, paged through reams of



graphics: Richard Sloan, courtesy of Nature House, Inc.; Griggsville, IL 62340

The exact date of the prairie chicken's arrival in eastern Montana is unknown. The best information is based on what occurred in North Dakota and suggests they arrived in Montana about 1900, peaked between 1900-30, declined drastically during the 1930s and disappeared in the early 1940s. From information presented in M. D. Johnson's bulletin, "Feathers from the Prairie," a North Dakota Game and Fish publication, prairie chickens and their westward advance across North Dakota were fairly well documented by the agricultural movement as it moved across the state.⁵ According to Johnson, prairie chickens were not present in North Dakota before 1870. Through some extensive research, the upland game biologist found that prairie chickens were fairly numerous in the Red River Valley in the early 1880s and then spread in 15-20 years to all parts of North Dakota, except for the badlands.

old newspapers, examined numerous bird journals and manuscripts, checked dozens of faded photographs and evaluated countless fragments of information alluding to prairie chickens. I found it difficult to separate the "wheat from the chaff" in attempting to document the prairie chicken in eastern Montana. The primary difficulty was confusion with the sharp-tailed grouse—which many Montanans call the "prairie chicken." Were they referring to sharp-tailed grouse or had they really seen prairie chickens?

The following excerpts, from an historical book, "Sheridan Daybreak," illustrate the dilemma:

The long winters were very difficult although there was one advantage in winter, it put meat on the table. Rabbits, wild ducks, prairie chickens, etc. were plentiful. (Andreas and Anna Lund; Outlook, Mont., 1907)

After harvest, hunting was a great sport, as there were many kinds of ducks as well as prairie chickens and wild geese. (Jermina Norton; Medicine Lake, Mont., 1907)

Wild game was plentiful and since Mr. Bentsen had earned a marksman award from the Norwegian Army, one round of ammunition usually provided the fresh meat and Mrs. Bentsen served meals of prairie chicken, duck, and sometimes rabbit. (Ole Bentsen; Redstone, Mont., 1909)⁷

Excerpts from the Wibaux-Pioneer Gazette further illustrate the problem:

Bag Comrades for chicken. . . . Elmer Farnum, John Kalkman, J. W. Olsen and a friend, started out to hunt prairie chickens last Saturday. The birds escaped but two of the hunters were shot instead. (Sept. 24, 1915)

Game is scarce in Wibaux County . . . the prairie chickens are almost extinct. Some have claimed that a disease has taken many of them. Others have blamed the pheasants and partridges for destroying the chicken eggs, but if the real truth was known, the depredation of those, who could not resist the temptation to wait the proper time, are largely responsible for their scarcity. (Sept. 23, 1926)

Donald Shirley, 26, of Great Falls was struck by part of a charge of shot fired by a companion at a prairie chicken. (Dec. 27, 1928)

Aretas A. Saunders, pioneer ornithologist in Montana during the early 1900s, included the prairie chicken in his 1921 bird manuscript, "A Distributional List of the Birds of Montana."⁸ He wrote, "One bird taken by John R. Bane on the Hervey Bench, southeast of Huntley in the fall of 1917 (Thomas, M.S.). At present the only record for the state." But doubt about the validity of this documentation remains. Dr. P. D. Skaar, professor of biology at Montana State University in Bozeman, pursued Saunders' documentation. Skaar believed that evidence of the bird taken by Bane was based on hearsay and there was insufficient information for a valid documentation.

But other sources I checked confirmed—at least in my own mind—that the prairie chicken was a *bona fide* resident of the state after its emigration from North Dakota. When Johnson was interviewing old-timers in North Dakota for historic occurrences of prairie chickens there, one of his contacts, J. B. Lyon, told Johnson his best hunt took place in Montana in 1904 ". . . when four of us drove a buckboard into the sandhills about 25 miles

north of Culbertson, Montana, and hunted four days along the Little Muddy. We brought back over 200 chickens. This did not include all the birds we used for camp meat. All were 'squaretails' [a common name used by some hunters for prairie chickens]."

Frank Reuter, rancher and long-time resident of the Medicine Lake area, related in a personal communication that ". . . only sharptails inhabited the sandhills around the ranch, but there was a large dancing ground of prairie chickens until about 1940-41 in a hay meadow northeast of the ranch."

Another long-time resident of the Medicine Lake area, Victor Johnson, now residing in Homestead, Mont., told me he distinctly remembered a hunter coming into Homestead about 1919 with two prairie chickens shot south of town. Johnson was sure they were prairie chickens and not sharptails, because he remembered his brother shooting prairie chickens in Willmar, Minn., before moving to Montana.

Joseph A. Morin, Circle resident and former employee of the U.S. Fish and Wildlife Service, saw prairie chickens in the Wolf Creek area west of Plentywood during fall 1936. Morin's last observation of prairie chickens was near Dagmar during the early 1940s.

The 1936-62 monthly narratives at the Medicine Lake National Wildlife Refuge provided the most reliable information about the prairie chicken in Montana. A monthly narrative report for May 1936 stated: "One afternoon was spent on Big Island in Medicine Lake. Local residents say this island used to carry large numbers of prairie chickens, sharp-tailed grouse, and Hungarian partridges." A narrative report for fiscal 1937 refers to a list of waterfowl, shorebirds and upland game birds known to have nested on the refuge in 1936 and their nesting abundance. William T. Krummes, then assistant refuge manager, listed the "prairie hen" as rare. There appears to be no confusion with other upland game birds since the sharptail, Hungarian partridge and the ring-necked pheasant are also mentioned. Furthermore, the narrative contains two black-and-white photos of a prairie chicken, with the caption: "Male Prairie Chicken 'booming'—photo taken just north of Medicine Lake." In fiscal 1938, the prairie hen was again included on the refuge's checklist of birds, this time as an "occasional" nester.

The narrative reports do not mention the prairie chicken again until 1961. In the May-August narrative, Refuge Manager Robert C. Watson wrote: "Reports of token populations of prairie chickens in this area have been received from two reliable sources but we have been unable to verify the sightings." The last mention of prairie chickens in the Medicine Lake area was in the January-April 1962 narrative. In the upland game bird section, Watson wrote: "Upland game birds in this area include sharp-tailed grouse, ring-necked pheasant, and gray partridge. Occasionally a prairie chicken is reported but sightings are extremely rare."

No one knows how much of eastern Montana was inhabited by the prairie chicken during the "good" chicken years, but what little information we have suggests that populations centered in the mixed grass prairies of the northeastern part of the state, around the towns of Plentywood, Medicine Lake and Culbertson.

There was probably some “spillover” from North Dakota into the Wibaux, Sidney and Baker areas.

Why did the prairie chicken fail to spread more extensively into Montana? No physical barriers east of the Continental Divide or anatomical limitations are apparent which could have prevented further westward movement. But the limitation might have been an environmental one: the short grass prairie.

North American prairies can be divided into three ecological types: tall grass, mixed grass and short grass, each a separate belt of territory running north and south across the American heartland. On the eastern tall grass prairies, grasses often grow eight or 10 feet tall. Farther west, the mixed grass prairies begin, and these mixed prairies blend eventually into the drier regions of short grass prairie which cover most of Montana east of the Continental Divide.

In my search for documentations of prairie chickens in eastern Montana, I could find no sightings I considered valid in the short grass prairie. Lauren Reuter of Medicine Lake related to me that Halver Skillingberg, early homesteader in the Homestead area, told him that a neighbor of his drove cattle to Minot, N.D., and noticed that prairie chickens increased as he went farther east. It seems logical to assume that the shorter grasses did not provide habitat suitable for prairie chickens.

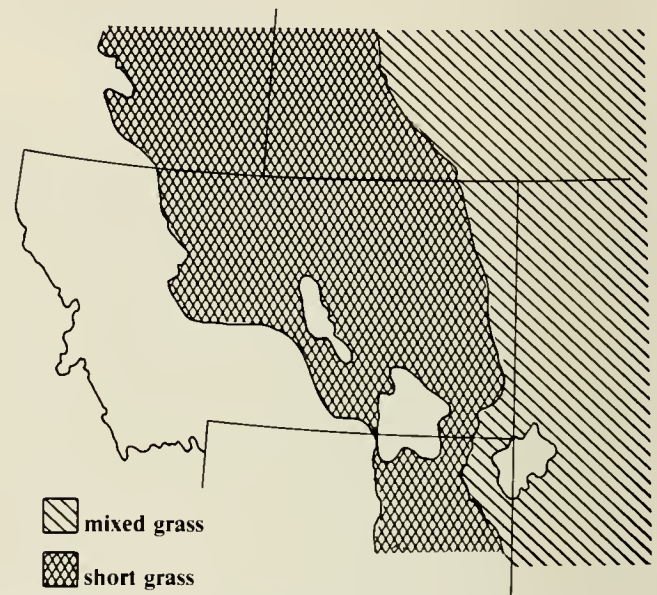
The prairie chicken’s disappearance from Montana was just as secretive as its arrival. Small, isolated populations were probably still present in the early 1940s. Art Suckow, long-time resident of the Intake area, commented in a personal communication: “I did see seven or eight grouse at a gate I was opening. The time of year was in part of June 1944. I have never again seen that kind of chicken since. I noticed they had yellow feathers on the neck and I do remember the barred feathers on the breast. I was only about 20 feet from them. I know they were not sharp-tailed grouse.”

Numerous reasons have been advanced for the decline and *coup-de-grace* of the prairie chicken in Montana and elsewhere—overhunting, hard winters, droughts, prairie fires, predators, cyclic fluctuations, intrinsic biological weaknesses, competition from other species of upland game birds. But most authorities focus on destruction or alteration of the prairie chicken’s habitat. As Johnson speculated, the prairie chicken flourished as homesteaders began raising grain on small areas. Then, in later years, many small ranches and farms were abandoned or incorporated into larger holdings, leading to sizable areas of intensive cultivation and grazing. With little winter food on the grasslands and virtually no nesting cover on the farmlands, prairie chickens disappeared or faded from the picture.

Johnson further speculated that the prairie “boomer” could have marched in step with the sodbuster across the interior grasslands of North Dakota—as long as a delicate balance in land utilization was maintained by the agriculturist. Although this theory has not been widely debated, some ecologists such as Leo M. Kirsch believe other ecological factors should be considered. Kirsch, formerly a biologist with the U.S. Fish and Wildlife Service who now works with Ducks Unlimited, believes

circumstantial evidence exists that prairie vegetation changed markedly when the buffalo were removed.⁹ Kirsch suggests this change may have benefited the distribution and abundance of prairie chickens.

Before 1870, during what is still referred to by some as the “buffalo period,” roughly 60 million buffalo grazed on the North American prairies.¹⁰ Grasslands were subjected to relentless grazing. Journals of some early travelers attest to the lack of sufficient grass to sustain saddle and trail horses because buffalo herds passing ahead had so thoroughly devoured the grass. Such short grass prairie was evidently not acceptable as habitat for the prairie chicken, and the buffalo populations may account for why Lewis and Clark—as well as John James



Rangeland types in Montana. The tall grass prairie is not represented in the state (taken from Kuchler, A. W., “Potential Natural Vegetation of the Conterminous United States,” American Geographical Society Special Publication No. 36, 1964).

Audubon on his 1843 journey—saw no prairie chickens above the Big Bend of the Missouri River in South Dakota.

But what about isolated areas of interior grassland not subjected to intensive grazing by buffalo? Historian George Catlin provides an interesting account in his book, “North American Indians,” where most of the garrison at Fort Leavenworth, Kansas, dined extensively on prairie chickens during early fall 1830.¹¹ Catlin mentioned grasses eight feet tall, made no reference to heavy grazing by big game and commented on wide-ranging fires almost annual in occurrence. His description suggested a dense, continuous vegetational cover.

Then the great buffalo herds were systematically and speedily slaughtered. From about 1870-90 there occurred a period of range recovery. The grasslands were free of heavy grazing pressure, and the homesteading boom (which, as we have seen, had its own influence on prairie

vegetation) had not yet begun. Rainfall during the period was above average. This combination of factors allowed the sparse western plains—including eastern Montana—to blossom into a highly productive mixed grass prairie. The change, according to prairie ecologists, may have had a tonic effect on the abundance and distribution of prairie chickens.

A. Johnston and S. Smoliak, researchers for the Agriculture Canada Research Station in Lethbridge, Alta., concluded in their studies of the greater prairie chicken that the ungrazed grasses and scattered tracts of cultivation that characterized the Prairie Provinces from 1880-1900 provided ideal habitat, and prairie chickens increased rapidly. "By about 1880," according to Johnston and Smoliak, "the western prairie was devoid of grazing animals and because the late 1870s and early 1880s were much wetter than normal, the grass grew luxuriantly. Even though prairie fires continued to remove some topgrowth, the prairies benefited from non-use and produced a cover of grass the like of which had never been seen before and which will never be seen again. Light use continued until about 1920."¹²

For several decades, the greater prairie chicken survived extremely well in its expanded range. When farming and grazing operations intensified, the prairie chicken didn't have enough time to perfect evolutionary responses to cope with the new set of environmental conditions.

Today, the greater prairie chicken has been eliminated from much of its acquired range and has seriously declined in or been eliminated from virtually all of its original range. Only in Kansas, Oklahoma, Nebraska and South Dakota can populations be considered safe, and in South Dakota the population is declining.

In many areas such as Montana, the prairie chicken is now no more than a symbol of our untamable past, of that sweep of millennia which underscores and tempers the daily affairs of wildlife and men. It was only a visitor in the state for a short time, and we are not really sure when the last prairie chicken boomed its last farewell. But its disappearance signaled the start of a silence probably never to be broken—unless, by chance, on some distant prairie of a remote galaxy. ■

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